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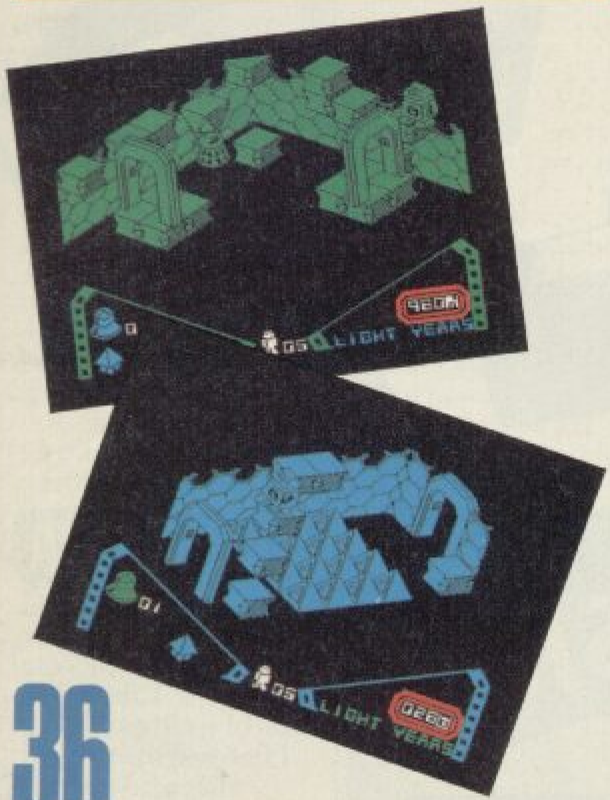
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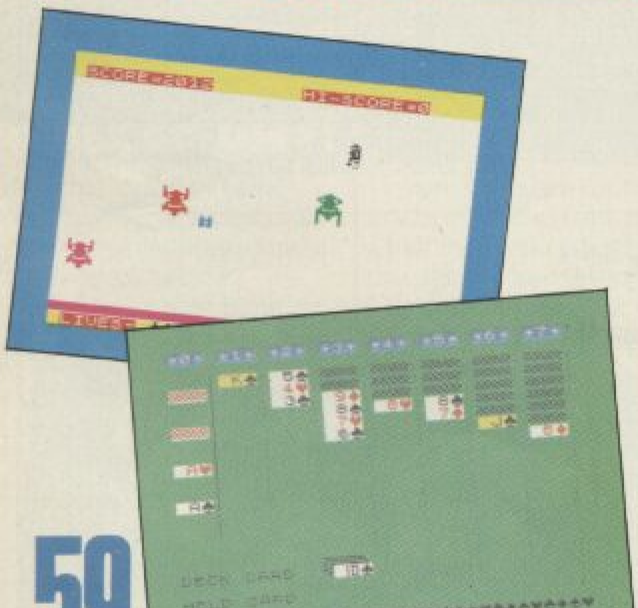
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COVER BY MARK WATKINSON

Discover the latest in disk drives. Boogy on down to the Hippodrome with our compo winners. Is Hewson's new game all torc? Have you walked off with a Wafadrive? Find out first ... in Frontlines!

FRONTLINES

DISK-OURSE



Too hot to handle? Our first review copy glowed like a furnace — reminders of old ZX80 days.

Opus Supplies have just announced the release of a new $3\frac{1}{2}$" disk drive system specially designed for the Spectrum and Spectrum+.

As well as plumping for the smaller size disks, the Opus Discovery 1 also offers — deep breath — a peripheral through connector, joystick interface, parallel printer port, monitor output and on-board power supply. Not bad, eh? All this will obviously put it in direct competition with the Wafadrive which also offers an impressive list of extras, but uses the less reliable stringy-floppy method.

If you're worried about the lack of support for the Discovery, you'll be pleased to know that Boots and Memorex have given it their backing. Still, look at the list of supporters Rotronics and Sinclair were hawking around when they launched their alternatives to the disk.

Interested parties *(why weren't we invited — Ed.)* should contact Opus Supplies on (0926) 311174.

ALL AT C

Hisoft has just released version 1.1 of its C compiler for the Spectrum. C is a very flexible and easy to learn language (it says here) that was originally designed for writing operating systems. You may not have to be a megabrain to learn C but it's not a beginner's language. Little errors in it can cause big crashes.

Still, if you're bored with Basic and fancy knocking out an operating system or two before tea, Hisoft are on (0582) 696421.



Don't know what he's looking so happy about! As the first person to complete Hewson's dark-age 3D drama, *Avalon*, Colin Hoare (him on the left) has now got to face up to the almost identical *Dragontorc*. That'll wipe the smile off his face.

HERPES OR BUST

This month's 'failed pole-vaulter' award (for grabbing the wrong end of the stick) goes to Malan Associates. They complained because we described their game Herpes or Bust as 'bug ridden' — this was a *joke*! Not that tasteful, but then neither is the game. In the interests of fairness, we donned the surgical gloves and took another look. As it is Quilled, we couldn't find any coding bugs but some of the problems were so illogical they'd have given Mr Spock an emotional breakdown. So, apologies to Malan Associates for not putting quotes round the word 'bug'. But perhaps if their sense of humour were more developed, they would not only have got the joke but written a more amusing game in the first place.

IT'S GOT TO BE GORDONS

Now you and your Spectrum can plug into the power of the mains. Or rather, Gordon Micro Ltd, a new company from Ayr has itself launched onto the market with a product which claims to give the Speccy owner the power of a mainframe computer in miniature.

The Gordon Microframe, is not the prettiest of peripherals. No doubt, if enough interest is shown it will be re-housed in a designer black box to make it indistinguishable from all other Speccy add-ons.

For the technical user function's more important than form. The Microframe provides a disk interface plus five 64-way slot connectors. And if you don't know what you'd do with a 64-way slot connector then you don't need a Microframe. There are much cheaper disk interfaces on the market if that's all you're looking for, but if you've got the cash, Gordon Micro can be contacted at 3 Callendar Road, Heathfield Industrial Estate, Ayre KA8 9DJ.

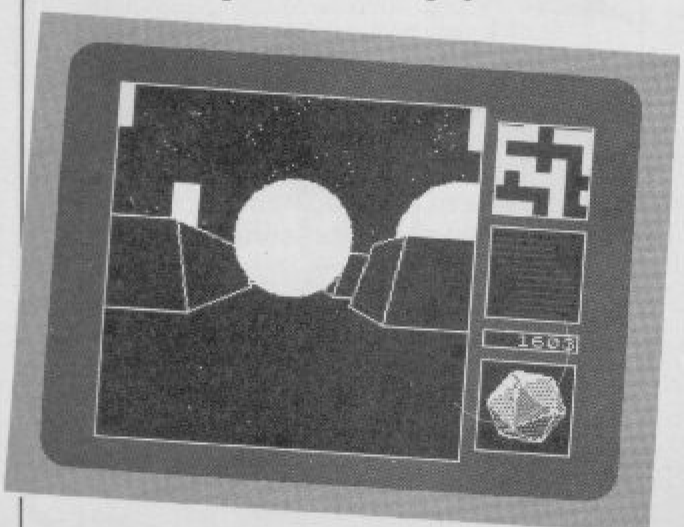


So simple even a child can crash it.

SLEEP ON IT!

What a load of balls! They are, in fact, deadly spheres rolling around a complex maze in Firebird's new game, *Gyron*. It's taken four mathematicians four and a half man-years to write the game — and it shows. The graphics are stunning but the game is so mind-blowingly boring it'll take four and a half mathematicians even longer to solve it. That's why Firebird is confidently offering a prize of a Porsche 924 to someone who cracks it. Course, they're also saying that cheating is impossible, but then, you know what we think of that and where to send your POKEs!

Certainly not a game worth losing any sleep over — in fact, it'll be pretty difficult not to sleep over it. £9.95 secures this sleeping tablet substitute from Firebird on 01-726 4444.



Gyron — not exactly a ball of fire.



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FRONTLINES

Could this be curtains for the ZX Microfair? Not yet, but the recent show at Alexandra Palace was definitely showing signs of shrinkage. A large curtain cut off about a quarter of the north end of the hall.

The real problem is the lack of exhibitors. The big boys wouldn't be seen dead exhibiting on a wobbly wooden table. Don't let that put you off coming to the next fair, though — without you a little bit of Sinclair history could die forever. As our pictures show there are lots of innovative ideas and plenty of interesting people to meet (*as well as some weird ones — but then you don't have to talk to Troubleshootin' Pete — Ed.*).



FAIR'S FAIR...



◀So, we finally caught up with her at the Microfair. The culprit was cornered red-handed clutching all your copies of *YS Megabasic* to her chest. Happily, we've now prised them from her grasp and despatched them.

What can we say but a big sorreeeee to all our readers who have waited so long for the software to super-charge their Spectrums.

As for poor Jill, a little compassion is called for. It's not really surprising that software of the standard of *YS Megabasic* should send her slightly loopy! Of course, an even greater madness would be not to have your own copy.



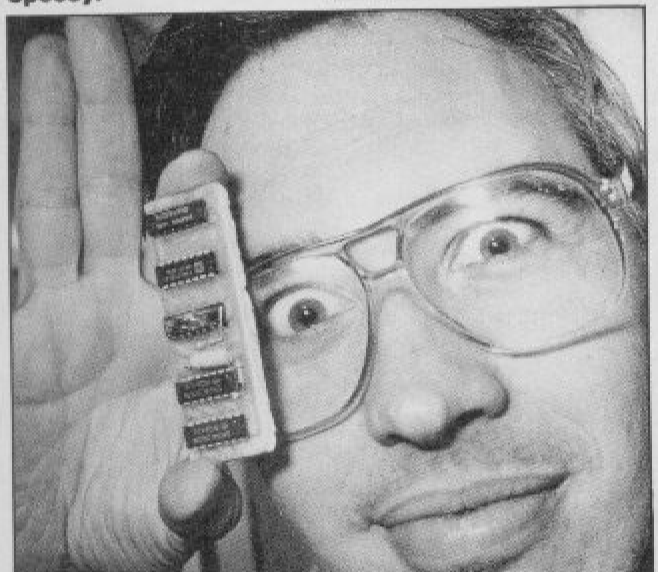
▲Now it's explained why all speech synthesizers sound like alien fuhrers with a fit of flatulance. And we'd tell you more about Varitalk if we'd understood a word that Daft Ada here was saying.

▶Wow, with graphics like this it's just a shame that a photo can't do justice to the sound.



▼A member of the Adams family showing some of his inner workings. Steve Adams, *YS*'s very own hardware expert is holding the XK expansion unit, now available from TV Services of Cambridge on 0223 358366, for the paltry sum of £15.95 as a kit or £20.95 fitted. Of course, you could always fit yours into a Speccy.





▲Romantic Robot has tackled a very unromantic subject in its first game, *Wriggler* — maggot racing. It all takes place at the Annual Maggot Marathon and features 250 screens and six different locations. You are one of the four maggot contenders in the most dangerous and closely-fought contests in the insect sporting calendar (*I don't believe a word of this — Ed.*) £5.95 secures your place in the Maggot Marathon.



▲Flushed with his success over the Speccy, Sir Clive launches the electric bidet which immediately goes down the toilet.

FRONTLINES



Old Ed with sore 'ed. Wafadrives keep falling....

WAFAWINNERS

At last! The Speccy office ground to a halt for days while we sorted through the Wafadrive competition entries, but now we can finally announce the winners.

Nobody, out of the thousands of entrants, came up with the *exact* solution to the features list, so we decided to award the prizes to the wittiest and most amusing captions.

Of course, what Roger was really saying in the compo photo is completely unprintable. Well, we were throwing a pile of Wafadrives at him! But of course, you offered some more original ideas — **A. Thomsett**, suggested "Only 12 more to collect and I can move onto the next room". **Mrs Carol Wadsworth** thought Roger might be saying "'We'll drop a couple into the office', they said!". **Phil Day** came up with the topical caption — "The price is right, so come on down!". Cheers Phil.

OK, so they sound a bit naff *now*, but you haven't just read 'Wafadrives keep falling on my head' for the thousandth time.

Thanks for all your entries (*even the Wafadrives on the head ones — Ed*). — and we're sorry that you couldn't all win;. Those of you who did, however, should be keeping an eye open for your wafadrives. They'll be dropping in on you soon! Here are the winners, listed in no particular order;

P.J. Bennet, London; A.R. Thomsett, Rainham; Stephen Jones, Carnforth; Nikola Lalic, London; J. Buchan, Morayshire; J Lehane, Swansea; Carol Wadsworth, Sunderland; Phil Day, Grimsby South; Cedric Roberts, Rothienorman; M. Aill-Merrick, Swanley; Mr A. Raven, Basildon; Ian Heath, Wirral; Peter Richardson, Sheffield; Tim Smith, Andover; Stewart Lillington, Chard; Reveval Williams, Newtown; Tony Davies, Birkenhead; Elout De Kok, Hoogeveen, Holland; Tony Bunt, Cornwall; John Moody, Sandford on Thames; Edward Hepburn, Dunfermline; Douglas Brownlie, Bargeddie; Brian Toohey, Douglas; Iain Walker, Rochdale; D.A. Owen, Bow Street.

Well done you lot!



Spot the real *Sherlock*. If you can't, you're not going to get very far on Melbourne House's game about the super sleuth, are you? You're certainly not going to be the first to crack the mystery because Paul and David Cunningham got there first. So, now tell us who's the dummy!

CAPITAL PUNISHMENT

Another milestone *(don't you mean millstone? Ed)* in home computing is reached this month — a book with a title more complex than its subject matter, Capital Radio's *Book of Computers and Simple Programming.* And it would have to be simple because it's written by none other than Troubleshootin' Pete. Course he did have a little help from our own Roger Munford and Capital Radio DJ, Kelly Temple. *(OK, so don't think I'm in a huff 'cos I wasn't asked. Ed) (What do you know about computers anyway? Troubleshootin' Pete)*

Published by Interface for the exorbitant sum of £3.95, you'll find copies in most grotty bookshops. Still, it'll probably be remaindered shortly and you can buy two and start pressing flowers.



FROM THE H/P



Another busy month on the Helpline. I do like solving your problems (*instead of causing them! — Ed.*) but only if you use the Helpline number on the days and times given below!

First off was a call from **Jim Stone** of Worcester with a very common enquiry. How, he asks, can I transfer my games' collection to Microdrives? Mmmmm. This is not a task I would recommend you tackle without some sort of aid. The two bits of software I have found most useful are Trans-Express by Romantic Robot and MD1 by Lerm Software. The first one is the simplest to use but MD1 can cope with more programs. If you have both, it's likely that one will handle a particular file type even if the other one can't. By the way Jim, I hope your games collection doesn't consist of commercial software because copying that to microdrive is *illegal.*

At last, YS Megabasic has hit the streets, so I wasn't really surprised when the calls came flooding in. **Michael Grove** of Peterborough was the first in with a problem caused by the Interface 1 unit attached to his Speccy. Well, Michael, you need to enter a Microdrive command *before* loading *YS* Megabasic. This way you let the program know that it's dealing with shadow ROM. For example, if you enter the CAT command before loading up from cassette and ignore the error message 'Microdrive not present', this will simply initialise the shadow ROM as being present.

Michael has picked up on a problem not covered in the manual. Nice one, Michael. If you don't understand something or if you think you've found another omission then drop us a line to Megabasic Bugs, 14 Rathbone Place, London W1P 1DE.

Let's get the other big cock-up out of the way before going on. **Lee Towersey**, from my home town of Staines in Middlesex spotted the deliberate mistake in *Tuning Up* in issue 11. Like Lee you may have noticed that Line 380 looks rather unfinished. That's because it is! The end of the line has somehow moved two steps down, tagged rather forlornly onto the end of Line 400. Just move it up and the rest falls into place.

One problem which bothers quite a lot of you is how to print messages on the bottom two lines of the screen. **Mark McAunden** of Glasgow phoned in to say that he knows that PRINT 1 works but wanted to know if there are any other methods.

Well Mark, you could try POKE 23659,0 which will give you 32x24 print positions. Be careful, though as any CLS or INPUT commands will crash the computer. So, before using any similar commands you should POKE 23659,2 first and then re-POKE 23659,0 after the command is finished. The screen is now yours!

The phones haven't stopped ringing about the *Ghostbusters* Hacker's Guide in the March issue. **Mike Parker** from Northumberland found that even after following the instructions to the letter he could not break in, let alone get unlimited busters. I've had a look and I think the gremlins may have inserted an extra line. Try deleting line 145 and see if that works. I haven't yet had a chance to give it a test run so let us know if it crash lands. The problem may be that a new version of the game has replaced the one we had. So, if you do have problems, please write to the Hacking Away column at the usual address. As a life-long self-confessed non-hacker, I'm not the person to talk to about your hacking hiccups.

Still, is you've got any other problems, remember, who ya gonna call? Troubleshootin' Pete, of course. Catch you on the phones.

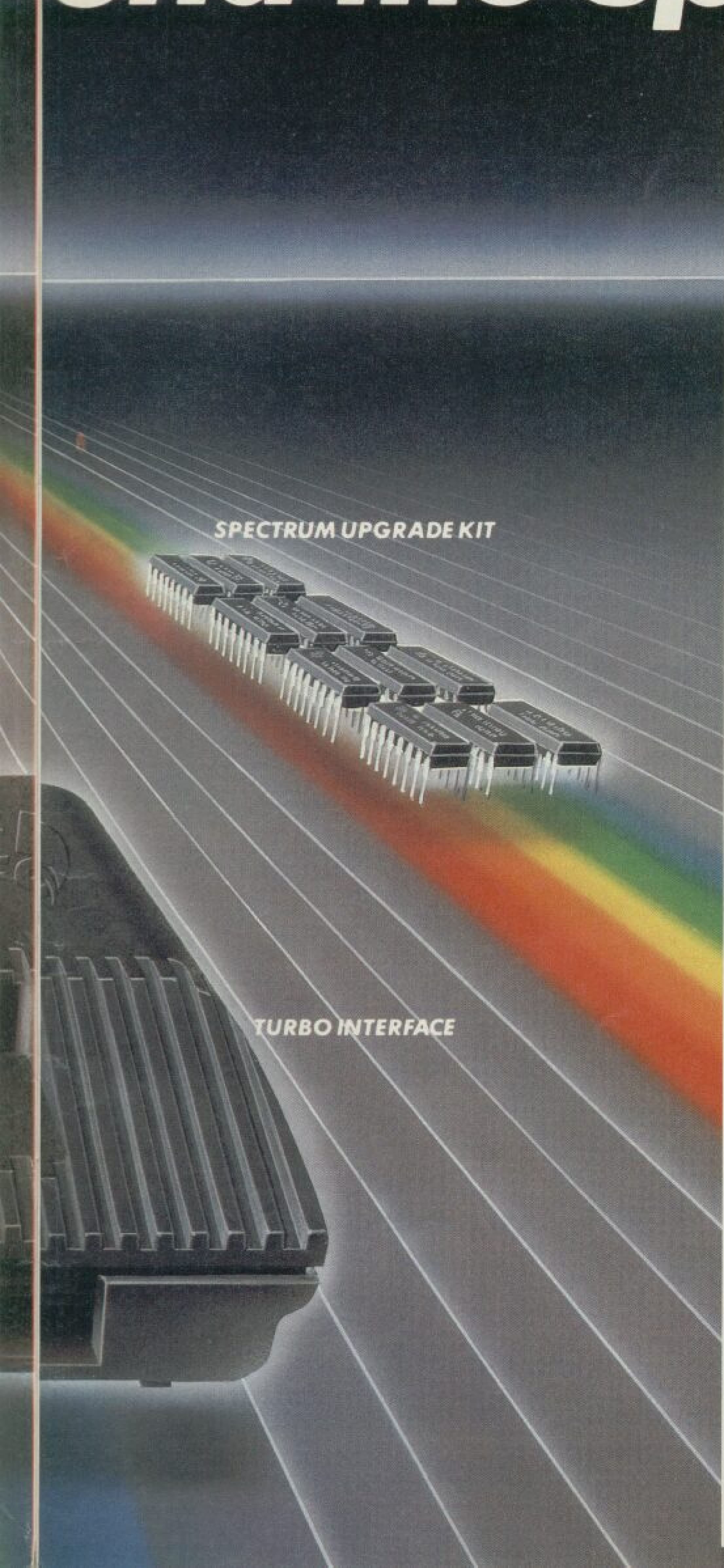
Troubleshootin' Pete

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LAZER BEAMS ONE DOWN

Just when you thought that the Spectrum+ had killed the add-on keyboard market, another casing for the rubber keys makes its debut. Stranger even than the time of its launch is the colour — it's white. What's this, a Spectrum peripheral that isn't black and isn't a three-wheeled washing machine?

Still, to make everyone feel at home Micro Board, the manufacturers have given it black keys. Shame they also printed the letters on the keys in black. To be fair, they will send a set of keys you *can* read to anyone who values their eye-sight. Think of the fun you could have re-defining the keyboard.

The keyboard is rather natty though, as it should be for 60 green ones. It has 62 full travel keys, a full space bar, low profile case i.e. flat, an on/off switch *(can't think what use that would be — Ed.)* and Interface 1 compatibility.

If you're still interested in a professional keyboard for your Speccy and you don't mind about the lack of colour co-ordination, then the Lazer could be worth a look. Give Micro Board a ring on (0483) 38006.



One keyboard that should work with Tasword Two.

Paperdata

The Spectrum Operating System

Steve Kramer/Micro Press £5.95

This book's shot straight to the top of my 'what did I ever do without it' list. Steve Kramer has really taken on a mega task in trying to explain the inner workings of the Spectrum's operating system — and he's done a tremendous job.

The first few chapters provide a gentle introduction on how to use some of the ROM's most useful routines. You'll find out about printing techniques, scanning the keyboard, clearing and scrolling the screen and how to control the PLOT, DRAW and CIRCLE commands, plus an in depth look at the cassette routines.

Enough there to fill a whole book, but there's much more. Interface 1 is next for the full treatment. When it was launched it really increased the power of the Speccy but the extra facilities that it offers have never yet been fully explained — until now that is. This book gives one of the best breakdowns of the new 8K ROM that I've ever read and, what's more, it's written in plain English. There are full details of how to use all the ROM routines, to control the micro drives, the network and the RS232 port. In fact, it'll tell you all you could ever want to know about the shadow ROM — but didn't know who to ask.

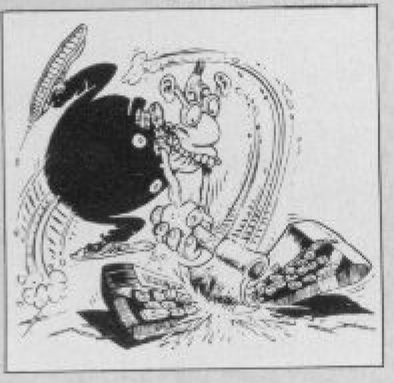
Steve Kramer also steers a course for you through channels, streams and ports. As well as showing what attaches where, he manages to make the whole subject of I/O ports fun with a program that produces speech by digital recording.

You've probably got the idea that I'm impressed — and you'd be right. This is one mega task that has been brought to mega conclusion. Check it out.

Tony Samuels



HACKING AWAY



The column with the infinite POKEs. Send your hacking hints to Andrew Pennell, Hacking Away, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

You'll notice that this month the POKEs are getting trickier and trickier as programmers become more and more devious. But they still can't keep a good hacker out. First off the mark is **Adrian Askins** with infinite lives on *Pyjamarama*. The hyperloader makes things a little tricky here, so a small program is required to get round it:

```
  10 CLEAR 29999: RESTOR
E 70
  20 FOR n=1 TO 14
  30 READ a: PRINT n+299
99,a
  40 NEXT n
  50 PAUSE 0
  60 RANDOMIZE UFR 30000
  70 DATA 221,33,59,127,
17,216,1,62,255,55,205,8
6,5,201
```

Run this and then start playing the tape at the first data block (not the program header) and press any key to load it. Stop the tape as soon as it's in, then use these POKEs:

```
  80 POKE 32844,207: POK
E 32845,26: POKE 32828,2
51: POKE 32829,201: POKE
 32789,243: POKE 32921,0
: POKE 33000,0
```

Next, to Hyperload it, enter RANDOMIZE USR 32789 and re-start the tape. If a loading error occurs rewind and try again. When it loads, it will not start, so for 'x' lives enter POKE 43883,x. Then use RANDOMIZE USR 64649 and away you go. You're now ready to make a right Wally of yourself.

Now it's reach for the sky time — for anyone having difficulty with *Sky Ranger* from Microsphere, **Paul Ryan** has come to the rescue. He has found the access codes which allow you to reach the higher levels: 1 — ENTER, 2 — MAGIC, 3 — PILOT, 4 — STOMP, 5 — PARIS and 6 — EVENT.

Mark Gibson would like to do a swop. He's offering the infinite lives POKEs for *River Rescue* — try POKE 33420,0 for player 1 and POKE 33452,0 for player 2. In exchange he'd like the POKEs for *Pinball Wizard* and *Cyber Zone*, so get cracking you lot.

Now on to a couple of goodies from **Karl Hampson**, starting with Starzone's *Zaxxon*. For 255 lives use POKE 48825,255. Melbourne House's *Sir Lancelot* is a bit trickier. For a lot of lives you'll need the following program:

```
   1 REM Sir Lancelot 'x
 lives
  10 FOR a=50000 TC 5002
4
  20 READ n: POKE a,n: N
EXT a
  30 DATA 49,125,91,221,
33,128,91,17,128,36,62,1
03,55,205,86,5,243,62,x,
50,38,92,195,8,92
  40 PRINT AT 1,3;"Load
Main Headerless Block"
  50 RANDOMIZE USR 50000
```

The 'x' in line 30 should be replaced with the number of lives you want — Karl tells me that he's not sure how high you can go but he knows that anything up to 127 works. Forward the tape to the main block of code, after the SCREEN$, run the program and then play the tape. I'm coming Guinevere!

Barry Costas has been on an exploratory mission in *Zombie Zombie* and returned with the news of a lost city. Yes, there are two cities in the game! To get to the other one, you must load the game as usual, go to the main menu without playing it, then press P followed by CAPS, and an input prompt will appear at the bottom of the screen. Enter (in upper case) SPACEMAN, then press ENTER. In lower case type in xchg and you are ready to do battle with another city-full of the undead (*keep an eye open for Troubleshootin' Pete! — Ed.*).

You may remember that some months ago I gave the infinite lives for Bug-Byte's version of *Manic Miner*. So that those of you with the Software Project's version don't feel left out, **A J Bull** has sent in POKE 35142,0 which does the same.

FRONTLINES

SATURDAY NIGHT SPECTRUM SPECTACULAR

Yippee! *Your Spectrum* boogy time! Yes, on a Saturday night last month the cosmic moment arrived when the winners of the Great Animated Hippodrome Logo Compo joined the *YS* team to bop the night away in 'The World's Greatest Disco'.

Trouble is, the starry-eyed group assembled in the glam surroundings, only to discover that we had lost, somewhere in the glittery emporium, not only our Hippodrome host but one of our winners *too*!

After several D.J. announcements and a fruitless search through the seething bodies, our Ed discovered the missing Graham Thorpe already tucking into his Hippo-burger unaware of the efforts of the *YS* search party!

Graham was united with Chi-Yeung Choy and they settled down to a taste of what their Hippodrome membership has to offer — spectacular circus acts, resounding music, hangovers the next morning and the chance to see their very own graphics on that *huge* video screen, plus a night at the Waldorf Hotel (*and the champagne... hic! — Troublemakin' Pete*) Congratulations, lads!



Don't panic — at these prices not a drop was spilled!

NORDIC IS ALIVE AND WELL ...

And living on Merseyside. After reading of their demise in last month's Frontlines, Nordic thought it'd better let us know that reports of its death were greatly exaggerated. All it had was a severe case of laryngitis.

The company hasn't gone into liquidation and didn't at any time in the past. It did have a communications problem, however, when no one could contact the office for a five week period. British Telecom had placed a redirect onto a dead line just when we were trying to suss out the situation.

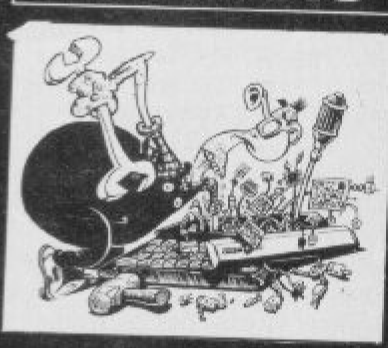
So, if you've recently bought a Nordic keyboard, don't panic. Nordic assures us that all guarantees will be honoured — they are determined to make a clean break with the less than illustrious Fuller tradition and are committed to the computer market.

If you want to talk to them on a line which is guaranteed to work (BT permitting), give them a ring on 051-678 9993 or 051-606 0088.

CALLING MRS. SPRING!

Following your desperate plea in last month's Forum, a very kind-hearted Mr Hart of Surrey has offered to send you his *brand new* Fuller keyboard free of charge! So, Mrs. Spring all is not lost after all! Please write to us again, and we'll put you in contact with him. And thanks to you Mr. Hart — it's good to see that *YS* readers spare a thought for one another!

·HARD FACTS·



When it comes to hardware* Stephen Adams *is an old hand — contact him at Hard Facts, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

Often the most annoying hardware bugs are the intermittent ones which only crop up after a couple of month's use. You start to wish the equipment would get it over with and just die. Sick Microdrives frequently come into this category.

One of the first letters I received on this subject came from **Don Alexander** of North Shields. His original problem was that he kept getting a prompt saying 'Microdrive Not Present' — and he assures us it was. The only way he could cure it was by re-formatting the cartridge. A new Speccy just added a new problem — the 'Drive Write Protected' prompt keeps appearing although the tabs on the cartridges are intact.

Well, what's needed here is a bit of a clean-up on the edge connector. If you can get your microdrive to accept CAT 1 but nothing else then it's a safe bet that the connection between the drive and the interface is loose or dirty. Use an ink rubber to clean off any gunge — actually it's oxide caused by the gold on the interface and the lead on the Spectrum reacting like a battery. If that doesn't cure the problem, make sure the microdrive isn't throwing a wobbly — it's only connected to the Spectrum by two screws.

The problem's not quite so simple for **Andrew Torry** of Zimbabwe. His Microdrive worked fine until one day he heard a click in mid-load. Now the motor works but he keeps getting the 'Microdrive not Present' prompt. And, yes, he's tried cleaning but to no avail. I'm afraid, Andrew, that it's going to have to go back to wherever it came. And that's a mystery because as you point out, there are no Sinclair agents in Zimbabwe.

We'll leave Microdrives for the moment, though I have no doubt we'll return to them!

B Duncan's telly keeps going green every time he plugs his Speccy into it. Prepare to turn green yourself 'cos it's reach for the jiffy bag time, I'm afraid. *Your Spectrum*'s colour synch signal is not being sent and it will have to go back to Sinclair (or repaired by experts).

C P Hewitt of Stoney, Stratford is also having probs with the visuals, though his trouble is caused by a monitor. He has modified his Issue 2 Speccy to run a composite video monitor but he is getting some annoying character-wide dark bars down the whole of the printable area of the screen. It's all down to the ULA which clocks the individual characters. You have two choices — there are plenty of TV repair men who could solve the problem or you could change to an RGB monitor using an RGB converter (Adapt Electronics' is excellent) which would eliminate the fault.

Connecting a Speccy to a television camera is a much trickier problem. But this is what **Nigel Dallard** wants to do in order to produce the credits for York Student Television. Well, it's probably easier to use the sync signal from the computer to control the cameras rather than the other way round as Nigel suggests. That can be done but it won't be cheap and will require a professional sync mixer.

Nigel also wants to know where he can get a curcuit diagram for the Speccy so he knows exactly where he's wielding his soldering iron. It's not that easy, but CPC (0772 555034) produce a repair manual or you could take a look at a book I've found useful, *Spectrum Hardware Manual!* from Melbourne House.

Dave Harris is having trouble with a Compusound beep amplifier. He writes, "I opened up my Speccy, inserted amp, removed beep loudspeaker, closed Speccy. What do you know, no sound!" Why on earth did you remove the beep speaker? The unit is designed to clip onto it! Removing the speaker is also aggravating the other problems which you're having.

So, that's it for another month..... but if your hardware is giving you headaches, just drop me a line at Hard Facts, 14 Rathbone Place, London W1P 1DE.


AT LAST...
THE AFFORDABLE ROBOT.
The Zero 2 Robot has arrived. It's the first truly micro robotic system available and remarkably it costs less than £100.
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ROBOT
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TOP 20

● THE YS *READER POLL*

A big hello to all you games addicts out there! Once again, we bring you the genuine, unfixed, non-hyped *YS Top Twenty* which keeps you (and us!) up-to-date with the latest in Spectrum software winners.

This month's chart is crammed full of golden oldies, so let us know what you think of the new releases as well. Take a look at Joystick Jury if you're stuck for ideas.

Now, the news you've all been waiting for — this month's lucky recipient of the three free pieces of software. **Stuart Dootson** of Winterbourne, Bristol was first out of the Ed's topper this month. He's just about to conjure up some magic software for you, Stuart, so keep an eye out for the postman.

So, remember all you gamesters out there, you can't win if you don't write in with those votes. Keep 'em coming. We'll soon let you know when the mailbags block the doorway. Fill in the coupon below and send it off pronto to YS Charts, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

YOUR SPECTRUM

My top five raves on the Speccy are:

1 ....

2 ....

3 ....

4 ....

5 ....

The next three games I'd like to buy are:

1 ....

2 ....

3 ....

Name ....

Address ....

....

.... Postcode ....

I understand that when this chart was tested — eight out of ten owners said their Spectrums preferred it. (*What? Ed.*)

Send your completed coupon post haste to:

YS TOP TWENTY, YOUR SPECTRUM, 14 RATHBONE PLACE, LONDON W1P 1DE.

YS TOP TWENTY CHART

THIS MONTH	LAST MONTH	MONTHS IN CHART	TITLE		COMMENT
1	2	4	**DALEY THOMPSON'S DECATHLON**	OCEAN	ALWAYS A WINNER! HE'S REACHED THE FINISHING POST AT LAST!
2	5	3	**UNDERWURLDE**	ULTIMATE	NEVER MIND *UNDER* — IT'S *OVER*TAKEN IT'S PREDECESSOR!
3	3	8	**SABREWULF**	ULTIMATE	THIS ULTIMATE ADVENTURE IS STILL KEEPING YOU WULFMEN HOWLIN' HAPPY!
4	NEW	1	**MATCH DAY**	OCEAN	STILL WAITING TO SCORE BUT IT'S HEADING STRAIGHT FOR THE GOAL!
5	12	3	**KNIGHTLORE**	ULTIMATE	ACTIVATE THOSE CHAMBERS AND GET TO THE CORE OF THIS ULTIMATE GOODIE!
6	1	11	**JET SET WILLY**	SOFTWARE PROJECTS	WHICH ROOM IS HE RESTING IN? WILLY ISN'T ALL OUT TO WIN THIS MONTH!
7	4	5	**TLL**	VORTEX	THIS SWING-WINGER ISN'T FLYING HIGH, BUT IT'S HAPPILY CRUISING ALONG THE CHART!
8	13	2	**MONTY MOLE**	GREMLIN GRAPHICS	THE GREMLINS ARE COMING OUT! HAVE YOU FOUND THAT GOLD YET?
9	NEW	1	**SKOOL DAZE**	MICROSPHERE	A REALLY CLASSY GAME — YOU COULD LEARN A LOT!
10	14	2	**GHOSTBUSTERS**	ACTIVISION	THE GHOULS ARE MAKING GOOD, SO GET BUSTIN'.
11	NEW	1	**CYCLONE**	VORTEX	COULD THIS BE THE CHOP FOR THIS COPTER GAME?
12	RE-ENTRY	1	**FULL THROTTLE**	MICROMEGA	THE BIKES CUT OUT LAST MONTH, BUT NOW THEY'RE BACK IN GEAR.
13	9	11	**ATIC ATAC**	ULTIMATE	ULTIMATE GAMES ARE TAKING THE CHART BY STORM! HAS THIS A GHOST OF A CHANCE?
14	NEW	1	**BOOTY**	FIREBIRD	GET PAST THE DASTARDLY RATS, PARROTS AND THE GHOST PIRATE TO CLAIM THAT BRONZE KEY!
15	7	11	**MANIC MINER**	SOFTWARE PROJECTS	OLD MINER WILLY IS GOING SLOW — WILL HE EVER STRIKE AGAIN? *(GROAN — ED.)*
16	11	11	**CHEQUERED FLAG**	PSION	REV-RIGHT-UP AND WIN THE RACE IN THIS SPEED BIKE FUN!
17	NEW	1	**BEACH HEAD**	U.S. GOLD	THE ENEMY'S LANDED BUT IT LOOKS LIKE YOU'RE KEEPING THEM AT BAY!
18	20	6	**THE HOBBIT**	MELBOURNE HOUSE	BILBO'S HOPPING BACK UP THE CHART — THERE'S NOTHING LIKE A FAMILIAR FACE!
19	RE-ENTRY	1	**HUNCHBACK**	OCEAN	WE'VE GOT A HUNCH THAT QUASIMODO COULD BE BACK TO STAY!
20	6	3	**PYJAMARAMA**	MIKRO-GEN	WALLY'S NIGHT-TIME KAPERS ARE DROPPING OFF A BIT NOW ...(*SNOOZE... ED.*)

JOHN HALLET

cp software FOR Spectrum, Amstrad, Commodore 64 & QL

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- **COMPREHENSIVE ON-SCREEN INFORMATION DISPLAYS:** contract, tricks won so far, cards played in current and last trick, score
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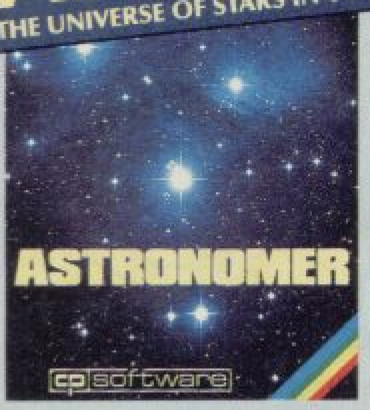
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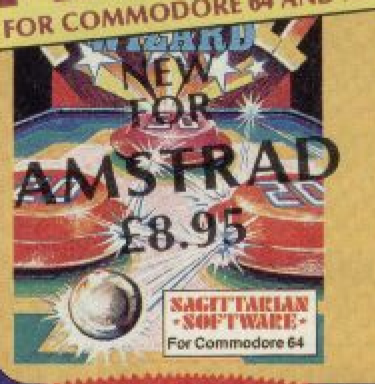
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FORUM

Write to us — there's a bundle of free Spectrum software for this month's Star Letter! Write to **Forum, Your Spectrum, 14 Rathbone Place, London W1P 1DE.**

NORTH OF WATFORD?

You see, we're not all dead 'up North', it's just an act! I'm afraid that Andy Pennell's 'Dumps of Distinction' has got me. I managed to put a couple of rolls of printer paper through the firm's accounts — and out pops this. (*That'll teach you to pay for your own paper in future — Ed.*) The machine code prints a column about 20" long, then the Basic pauses to allow the printer to cool down! Note that the Machine Code is called straight after channel open. Incidentally, this is one of my favourite games (*PSSST*).

I'd like to say how much I like your magazine, but my handwriting gets shaky when I giggle. Anyway, I'd best put this picture down and while I'm at it, have I got time to tell you about the Manchester Longsight Sinclair Users Club, which meets in Longsight Library on Wednesdays? . . . No?, Ah, well.

Roland Lumby
Whalley Range, Manchester

I'd like to say how much I like your photo, but my handwriting gets shaky when I roll around the floor laughing. Still, we have one thing in common — I like being PSSST as well. Ed.



```
  10 PRINT AT 10,0;"HUGE SCREEN$
 FANCY PRINTER COPY"
  20 PRINT ''"HAVE PRINTER READY
  LOAD SCREEN$"
  30 LOAD ""CODE 16384
  40 FOR N=0 TO 26 STEP 4
  50 POKE 32769,N: POKE 32772,N
  60 LPRINT : LPRINT : LPRINT :
LPRINT : LPRINT : RANDOMIZE USR
32768
  65 IF N=28 THEN GO TO 90
  70 FOR T=60 TO -20 STEP -2
  80 BEEP .1,T: PAUSE 50: NEXT T
  90 LPRINT : LPRINT : LPRINT :
LPRINT : LPRINT
 100 NEXT N
 110 BEEP .1,30: PAUSE 2: GO TO
110
 999 STOP
1000 LOAD ""CODE
1100 LOAD ""CODE
1200 RUN
9997 SAVE "HUGESCREEN$ " LINE 10
00
9998 SAVE "U.D.G.s"CODE USR "A",
64
9999 SAVE "McCODE"CODE 32768,120
```

This is the Basic part of the program which lets the poor overworked Speccy cool down after each strip-printing stint.

A	255	255	255	255	255	255	255	255
B	255	221	255	247	255	191	253	239
C	255	171	255	213	255	171	255	2139
D	170	85	170	85	170	85	170	859
E	85	85	85	85	85	85	85	859
F	0	84	0	42	0	84	0	429
G	0	34	0	8	0	64	2	169
H	0	0	0	0	0	0	0	09

USR "h"+7:READ u:POKE A,u . . . etc., Anyway, I'm sure I needn't go into that, 'cause you're probably sick to death of hearing about UDG generators.

TIME FOR BED

I really enjoy your machine code programs but they wear me out. I just don't have the time or the stamina to sit down and type in the whole program in one go. Press Caps Shift and 6 together to break into the Hex loader; type SAVE "file name" CODE <start address>, <length of code>; then, when you come back to your program, load back in the Hex loader and type CLEAR <clear address> (usually found in a line at the beginning of the Hex loader). List the program and locate the FOR . . . NEXT loop and change the first value so that it corresponds with the address you have got up to. Type GOTO 10, and away you go again. Don't forget to reset the Caps Lock again.

Martin Green
Fraserburgh

Thanks for the formula, Martin. It will work on most of the Hex loaders that we publish. Now I think I'll get some shut-eye — all that talk of sleep has worn me out. Troubleshootin' Pete.

DUMPING THE GEMINI

I have found a way of producing a Dump of Distinction with a Gemini-10X printer. You can do it by using the listing from Forum issue 8 for the Shinwa CP80 and changing the line feed to 4/144 and using dual density graphics. The lines to be changed are:

```
1110 DATA 127,62,4,205,20,127,
14,0,62
1120 DATA 27,205,20,127,62,75,
205,20,127
```

You'll also have to change the checksum. This will give a dense print of 11 cm by 18 cm. A more impressive print 20 cm by 27 cm can be made with;

```
1110 DATA 127,62,6,205,20,127,
14,0,62
1120 DATA 27,205,20,127,62,75,
205,20,127
```

Unfortunately, you will lose a narrow strip across the top of the screen with this routine.

```
ADDRESS          HEXCODE  MNEMONICS
8000 210040      LD       HL,4000
8003 110058      LD       DE,5800
8006 00          NOP
8007 00          NOP
8008 00          NOP
8009 0603        LD       B,03
800B C5          PUSH     BC
800C 0E08        LD       C,08
800E E5          PUSH     HL
800F 0608        LD       B,08
8011 E5          PUSH     HL
8012 D5          PUSH     DE
8013 C5          PUSH     BC
8014 0E04        LD       C,04
8016 7E          LD       A,(HL)
8017 0608        LD       B,08
8019 CB17        RL       A
801B F5          PUSH     AF
801C 1A          LD       A,(DE)
801D 3806        JR       C,8025
801F CB1F        RR       A
8021 CB1F        RR       A
8023 CB1F        RR       A
8025 E607        AND      07
8027 C690        ADD      A,90
8029 D7          RST      10
802A F1          POP      AF
802B 10EC        DJNZ     8019
802D 23          INC      HL
802E 13          INC      DE
802F 0D          DEC      C
8030 20E4        JR       NZ,8016
8032 C1          POP      BC
8033 D1          POP      DE
8034 E1          POP      HL
8035 24          INC      H
8036 10D9        DJNZ     8011
8038 E1          POP      HL
8039 C5          PUSH     BC
803A 012000      LD       BC,0020
803D 09          ADD      HL,BC
803E EB          EX       DE,HL
803F 09          ADD      HL,BC
8040 EB          EX       DE,HL
8041 C1          POP      BC
8042 0D          DEC      C
8043 20C9        JR       NZ,800E
8045 A7          AND      A
8046 3E07        LD       A,07
8048 84          ADD      A,H
8049 67          LD       H,A
804A C1          POP      BC
804B 10BE        DJNZ     800B
804D 00          NOP
804E 00          NOP
804F C9          RET
```

Get hold of an Assembler, Monitor or plain old Hex loader and type in this code. This needs to be organised from 8000 Hex, so make sure you CLEAR the space in memory for it.

Originally, I had hoped to modify the listing given for the Epson MX, but I found this too difficult. If anyone has been successful though, I'd be very pleased to hear from them.
A N Key,
Isle of Wight

So would we. This has to be the most popular dump, since Slough acquired a trading estate. Ed.

LOWERING THE TONE

If any fellow readers are writing programs using both INPUT and INKEY$ then the following technique may be of interest. After using INPUT leave the Spectrum with Caps lock set and subsequent INKEY$ may return upper or lower case letters. The usual answer is to laboriously check for the upper and lower case of each letter used.

A neater and more convenient alternative is to include the following line between INPUT and INKEY$, which cancels Caps Lock if it is set, and then only lower case need be checked for.

```
10 LET X=PEEK 23658: LET A=X:
FOR N=7 TO 4 STEP -1: LET
A=A-2^N*INT(A/2^N): NEXT N
IF A>=8 THEN LET X=X-8:
POKE 23658.x
```

It works by setting bit 3 of the system variable 23658 (FLAGS2) to 0. This acts as a toggle for Caps Lock. If you wish to modify the line to set Caps Lock instead, this requires only two slight changes.
J Sonander
Harrogate

Well done Mr Sonander, but what about turning Caps Lock on with POKE 23658,8 and then just checking for capital inputs? Troubleshootin' Pete.

MAC HACK

Thank you for printing the excellent Macman in the March issue. The only thing it needed to make it perfect was a joystick option. So, for the first time, I tried my hand at hacking and came up with the following, (without the use of a disassembler, I might add!) for use with the Kempston interface:

```
POKE 2956,0: POKE 2952,31:
POKE 29260,95: POKE
29261,194:
POKE 29265,0: POKE 29267,31:
POKE 29269,87: POKE
29270,194:
POKE 29274,0: POKE 29276,31:
POKE 29278,79: POKE
29279,194:
POKE 29283,0: POKE 29285,31:
POKE 29288,194
```

I admit this is not the most elegant way to use the Kempston port but it is consistent with the keyboard version and so does not affect timing. Also, it doesn't change the reference to the now disabled keyboard control in the instructions.
D W Arthur
Midlothian

Turning the tables on us, eh? The hackers hacked. Ed.

MEGABOARD

I am half interested in buying *YS Megabasic,* and half interested in buying a Spectrum+ keyboard.

Is it possible for you to bundle the two together, with new keys QL-style — i.e. without multiple printing to confuse the keys? I'd buy one.
Peter Walsh
Rochdale

*What do you mean, you're **half** interested in buying Megabasic? How can anyone still be dithering? This is **the** program of the year, and next year for that matter. However, we don't have any plans to bundle software and hardware yet (give us time!). If you really want a keyboard without the confusing legends, then you should take a look at the Saga 2+ or Saga 3 keyboards, both of which come with the option of having only the standard alphanumeric keys. Ed.*

MEGABUGFIX

It had to happen. As soon as you all got hold of your copies of *YS Megabasic,* you turned up bugs which I had unfortunately missed during the production of the program. All I can say is that it's such a big program it was inevitable that some things would slip through.

However, I have come up with a bit of code which will fix the few bugs that have come to light. Top of the flops is the MONitor bug. First of all, to get this code into MegaBasic, load up your master copy in the normal way and then type in the given listing to the MegaBasic system. Save the MegaBasic program you've just typed in, and then RUN it. If the Spectrum NEWs itself, then all has gone well; if you get an error report — check your typing!

To save the new version of MegaBasic, type SAVE "MB" CODE 44996,20373; or if you prefer to save onto Microdrive, type SAVE "M";1;"MB" CODE 4496,20373. When you want to load it all back in again, type CLEAR 44999: LOAD" "CODE, or from Microdrive type CLEAR 44999:LOAD *"M";1; "MB"CODE. Once loaded, Megabasic will automatically execute itself. That should stop anyone executing me!
Mike Leaman,
Torquay, Devon

*Cheers Mike. If you find any more probs with YS Megabasic you can drop Mike a line at **Your Spectrum, 14 Rathbone Place, London W1P 1DE**, and he'll sort it out. That or we'll send the boys round to sort him out. Ed.*

```
1000 LET C=0
1010 FOR A=47110 TO 47367
1020 READ B: POKE A,B
1030 LET C=C+B
1040 NEXT A
1050 IF C<>27311 THEN  PRINT "checksum error": ST
OP
1055 POKE 53361,195:DOKE_53362,47352
1060 RANDOMIZE USR 47110
1070 DATA 62,229,50,80,222,62,255,50,115,206,1,19
5,175,205,183,30,33,36,219,34,196,175,33,50,184,9
4,35,86,35,123
1080 DATA 178,202,183,17,1,3,0,237,176,24,240,195
,6,184,37,219,195,67,184,125,219,195,90,184,78,21
0,195,227,184,0,0,58,20,255,167,202
1090 DATA 20,5,33,84,184,229,237,115,61,92,207,49
,33,0,220,195,40,219,33,200,174,34,54,92,205,110,
13,175,211,254,62,6,50,72,92,50,143
1100 DATA 92,50,141,92,205,175,13,62,2,205,1,22,1
7,173,184,175,205,10,12,58,8,92,254,46,40,3,195,1
73,207,6,69,33,112,23,126,35,50,143
1110 DATA 92,229,197,175,17,164,184,205,10,12,193
,225,16,238,195,173,207,128,4,32,76,65,82,65,32,1
32,128,22,0,0,4,89,83,32,77,69,71,65
1120 DATA 66,65,83,73,67,13,13,3,86,101 114,115,1
05,111,110,32,49,46,49,13,13,2,127,32,7/,105,107,
101,32,76,101,97,109,97,110,32,49,57
1130 DATA 56,53,13,141,254,255,40,7,190,194,85,21
0,195,81,210,58
1140 DATA 52,233,167,202,179,181,193,175,201
1150 DATA 237,91,218,251,19,19,19,19,19,19,19,19,
19,195,117,208
```

This program kills all known Megabasic bugs dead!

THE YOUR SPECTRUM TRAINSPOTTER AWARD

We all make mistakes. (*Yes, incredible as it may seem, even me — Ed.*). Now all those of you who take great delight in pointing out all our minor misdemeanours will have the chance to achieve our highest accolade — *The YS Trainspotters' Award.* These certificates won't be given out lightly — you're going to have to reach previously unplumbed heights of pedantry in the reading of *YS* to get one. Signed with the ceremonial biro by the Ed himself, this is not a chance to be missed. So, get trainspotting those mistakes — there ain't that many of 'em! (*Tee hee. — T.P.*).

Our first award winner has trainspotted himself to stardom by pointing out our faux-pas in the Ghostbusters article in issue 12.

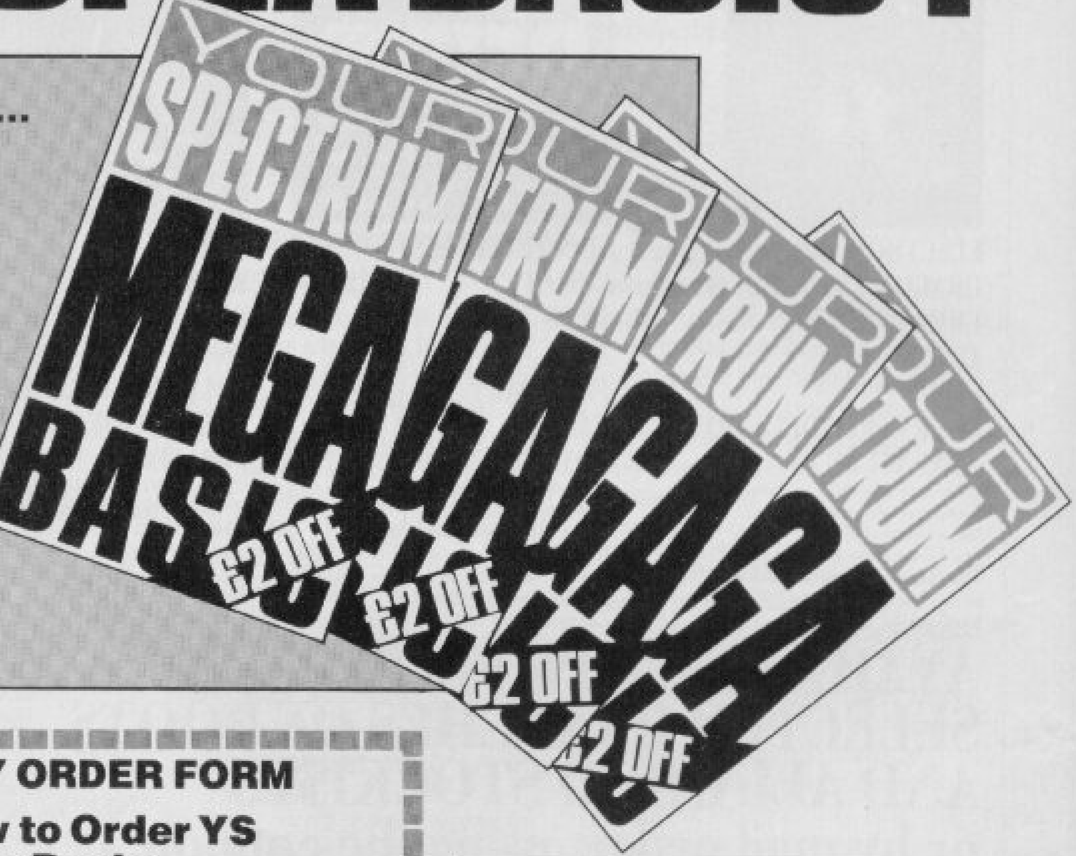
"How could you do it? How can you hold your heads up? Over the last couple of months I've been slimed by green ghosts and stomped on by the Marshallow man, but this is as nothing to the indignity of having to read a copy of *YS* with a Commie 64 screen shot in it. There I've said it', you've forced me to mention the 'orrible brown box by name. I managed to reach the Temple of Zuul so why couldn't you? Please promise to never let it happen again."
Terribly Disappointed
Chessington

Well Terry, I can call you Terry, can't I? you have become the first recipient of our coveted Trainspotters' Award. I do so hate a clever dick. Any more takers out there? Ed.

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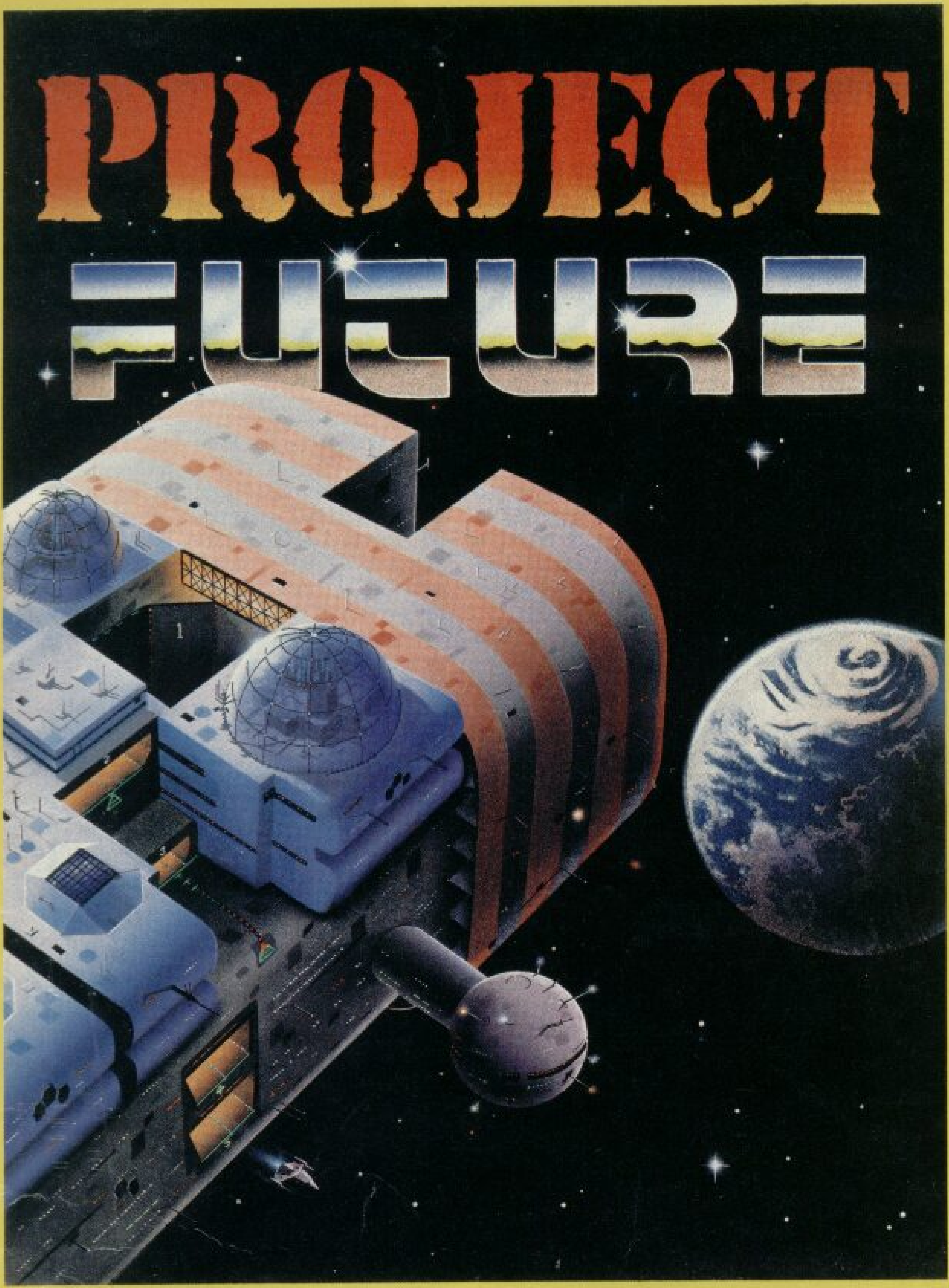
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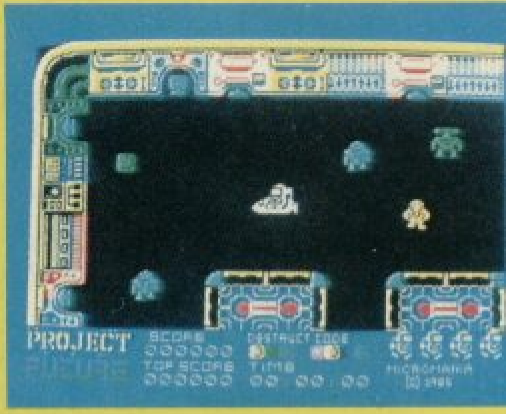
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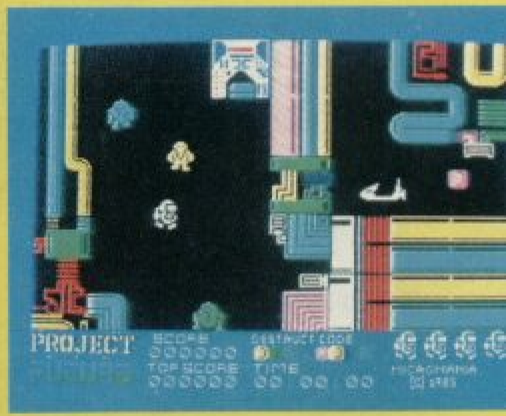
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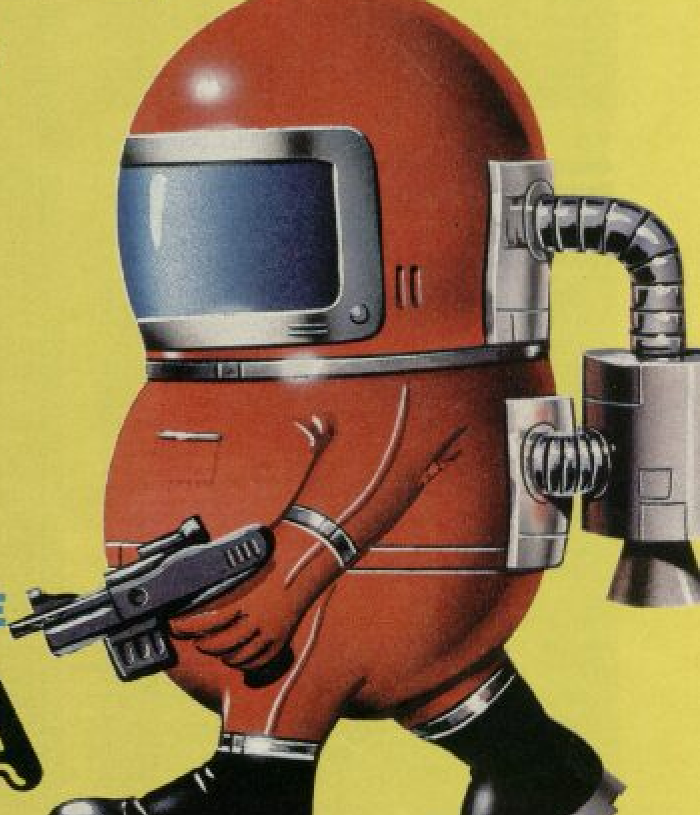
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PROJECT
FUTURE







PATCHING-UP THE 'DRIVES

Faulty files are now a thing of the past! Using this second instalment of code, Andrew Pennell shows you how to recover unloadable files from that Microdrive cartridge that's giving you hassle. Take it away, Andrew ...

In issue 8 of our most illustrious magazine, I got about half-way through devising a Microdrive repair kit that could smell out faulty files in an article called Running Repairs. Now, to finish it off, I have evolved a way of allowing the recovery of unloadable files from cartridge.

SORRY!

But first, an apology. Part one of this article, Running Repairs, was not quite the pristine job it might have been, and those with sharp eyes will have spotted the odd buglet or two; the pity is, I can't even lay the blame on our poor ol' Ed *(Poor yes, but less of the 'old'. Ed.)*. The problem is that we get a sector list that's minus some of the necessary data ... indeed, there are quite a few sectors missing. As it stands, this produces incorrect results in the 'check file' section.

Anyway, I've modified the code to improve the performance and, although it's still not perfect — some sectors that *do* exist may not be found on very full cartridges, and some will be marked as 'bad' when they're not — this is not so much of a problem now because one of the functions of the extra code given in this issue, is for it to act as an individual sector read, and this achieves perfect results.

Another problem in Running Repairs was the code's position in memory — RAMtop at 30000 proved too low for the extra Basic. Thus, I've provided a relocator program that'll shift the code for you — that'll teach me to hand in part one of an article before working out part two!

GETTING UNDERWAY!

So, before you enter this issue's section of code, you'll need to use the listing given to slightly alter the data you've already got in order to accommodate that given here. The relocator program achieves its object and corrects the problems described above; it then goes on to save the new code under the name 'SLC.2'. Once you've entered this little goodie, move RAMtop up to, say, 32768 to allow room for the new bytes shown in the second listing. (A word of warning — there's insufficient memory to allow both of these programs to be present simultaneously!)

The second program given here reads in 'SLC.2', adds the extra code to it and then saves it out as 'SLC.3'. In fact, it was while entering this listing myself that I discovered the low memory bug that still remains in the third version of the Interface 1 ROM. I tried a CAT command as soon as I realised that memory was running out and the system crashed in the most spectacular of fashions. But, as long as you don't get RAMtop below the value in line 100, you shouldn't have any problem on any of the Interface ROMs.

When you've sorted the machine code to rights, do a RANDOMIZE USR 32816 to allow the extra commands to be accepted by the syntax checker. Now enter the third listing given, saving it so that it starts at line 9000. It's an extended version of the first part's Basic.

▼1
This listing is used to alter the code given in Running Repairs to accommodate the code provided in this article — it also corrects the slight problem in the previous listing!

```
 100 CLEAR 29999
 110 LOAD *"m";1;"SL.CODE"CODE
 120 FOR i=30000 TO 30463
 130 LET a=PEEK i: IF a=117 OR a
=118 THEN LET a=a+11
 140 IF (i>=30141 AND i<=30154)
OR (i>=30225 AND i<=30228) THEN
LET a=0
 150 POKE i+2816,a
 160 NEXT i
 170 DATA 2,128,25,0,26,130,133,
255,140,129
 180 DATA 222,201,224,53,229,32
 190 RESTORE : FOR i=1 TO 8
 200 READ a,b: POKE 32816+a,b
 210 NEXT i
 220 SAVE *"m";1;"SLC.2"CODE 328
16,464
```

▼2
Once you've saved the code from the first listing as 'SLC.2', move RAMtop up to, say, 32768, to make room for the listing above, which reads in 'SLC.2', adds the extra code to it and then saves it out as 'SLC.3'.

```
 100 CLEAR 32815
 110 LOAD *"m";1;"SLC.2"CODE
 120 RESTORE
 130 LET s=0
 500 FOR i=33280 TO 33788
 510 READ a: POKE i,a: LET s=s+a
 520 NEXT i
 530 IF s<>57690 THEN PRINT "Dat
a error": STOP
 540 SAVE *"m";1;"SLC.3"CODE 328
16,1000
1000 DATA 245,205,144,131,241,25
4
1010 DATA 100,40,17,254,102,40
1020 DATA 31,254,115,202,173,130
1030 DATA 254,101,202,10,131,195
1040 DATA 240,1,215,32,0,205
1050 DATA 30,6,205,183,5,42
1060 DATA 214,92,34,251,131,195
1070 DATA 193,5,215,32,0,205
1080 DATA 30,6,254,175,194,40
1090 DATA 0,215,32,0,237,67
1100 DATA 201,92,205,30,6,205
1110 DATA 183,5,197,33,1,0
1120 DATA 34,218,92,42,251,131
1130 DATA 34,214,92,205,232,15
1140 DATA 221,126,25,205,247,23
1150 DATA 42,201,92,221,117,13
1160 DATA 33,255,0,34,201,92
1170 DATA 205,196,18,221,126,41
1180 DATA 221,190,13,40,12,33
1190 DATA 201,92,53,32,239,225
1200 DATA 54,255,195,107,131,221
1210 DATA 229,225,17,67,0,25
1220 DATA 205,169,24,1,14,0
1230 DATA 205,204,129,221,119,11
1240 DATA 17,15,0,25,1,0
1250 DATA 2,205,204,129,221,119
1260 DATA 12,221,54,0,0,221
1270 DATA 229,225,209,1,83,2
1280 DATA 237,176,195,107,131,21
5
1290 DATA 32,0,254,175,194,240
1300 DATA 1,215,32,0,205,30
1310 DATA 6,205,183,5,237,67
1320 DATA 253,129,33,0,131,34
1330 DATA 220,92,1,10,0,34
1340 DATA 218,92,42,251,131,34
1350 DATA 214,92,205,41,27,221
1360 DATA 110,26,221,102,27,6
1370 DATA 32,126,254,255,32,5
1380 DATA 35,16,248,231,15,221
1390 DATA 229,225,1,67,0,9
1400 DATA 235,42,253,129,9,1
1410 DATA 16,2,237,176,205,61
1420 DATA 18,195,107,131,0,1
1430 DATA 2,3,4,5,6,7
1440 DATA 8,9,215,32,0,205
1450 DATA 30,6,205,183,5,237
1460 DATA 67,253,129,33,0,131
1470 DATA 34,220,92,1,10,0
1480 DATA 34,218,92,42,251,131
1490 DATA 34,214,92,205,232,15
1500 DATA 221,126,25,205,247,23
1510 DATA 219,239,230,1,32,2
1520 DATA 231,14,33,255,0,34
1530 DATA 201,92,205,196,18,58
1540 DATA 253,129,221,190,41,32
1550 DATA 42,62,230,211,239,205
1560 DATA 125,131,1,104,1,245
1570 DATA 11,120,177,32,251,241
1580 DATA 0,221,229,225,17,55
1590 DATA 0,25,205,120,24,62
1600 DATA 238,211,239,221,203,24
1610 DATA 134,205,169,18,195,193
1620 DATA 5,33,201,92,53,32
1630 DATA 197,24,238,221,229,6
1640 DATA 10,221,54,71,0,221
1650 DATA 35,16,248,221,225,221
1660 DATA 203,70,206,201,33,163
1670 DATA 131,58,218,22,6,11
1680 DATA 254,255,202,108,128,33
1690 DATA 207,131,195,108,128,21
3
1700 DATA 130,41,27,82,130,232
1710 DATA 15,42,131,232,15,251
1720 DATA 130,61,18,101,131,120
1730 DATA 24,88,130,247,23,48
1740 DATA 131,247,23,103,130,196
1750 DATA 18,65,131,196,18,133
1760 DATA 130,169,24,112,131,169
1770 DATA 18,213,130,5,27,82
1780 DATA 130,165,16,42,131,165
1790 DATA 16,251,130,34,19,101
1800 DATA 131,179,21,88,130,50
1810 DATA 21,48,131,50,21,103
1820 DATA 130,169,19,65,131,169
1830 DATA 19,133,130,235,21,112
1840 DATA 131,142,19,1,0
```

▼3
This listing should be saved at line 9000. It's an extended version of the Basic given in Running Repairs.

```
 100 INPUT "Drive number ";d
 110 IF d<1 OR d>8 THEN GO TO 10
0
 120 DIM z$(250,13): DIM n$(13)
 130 *D d: *L d
 135 PRINT "Wait a sec..."
 139 REM find last item
 140 FOR i=1 TO 250
 150 IF z$(i,12)<>CHR$ 255 THEN
NEXT i
 160 LET n=i-1
 169 REM ove repititions
 170 FOR i=2 TO n
 180 IF z$(i, TO 12)<>z$(i-1, TO
 12) THEN GO TO 190
 182 IF CODE z$(i,13)>127 THEN L
ET z$(i)=n$: GO TO 190
 184 LET z$(i-1)=n$
 190 NEXT i
 200 LET c=2
1000 CLS : PRINT INVERSE 1;"
  MICRODRIVE REPAIR KIT      "
1005 PRINT ''"0. Output to ";"pr
```

```
inter" AND c=2;"screen" AND c=3
1010 PRINT '"1. Full catalogue"
1020 PRINT '"2. Sector list"
1030 PRINT '"3. Bad sector list"
1040 PRINT '"4. Check file"
1050 PRINT '"5. Examine sector"
1060 PRINT '"6. Repair sector"
1070 PRINT '"7. Remove sector"
1080 PRINT '"8. Change drive no.
"
1090 PRINT
1095 INPUT ;: PRINT #0;"Choose a
n option";
1100 PAUSE 0: LET a$=INKEY$: INP
UT ;
1110 IF a$<"0" OR a$>"8" THEN GO
 TO 1095
1120 IF a$="0" THEN LET c=5-c: G
O TO 1000
1125 IF a$="8" THEN INPUT "Drive
 no.";d:*D d: GO TO 1000
1130 GO SUB 1000+1000*VAL a$
1140 IF c=2 THEN PRINT "Press an
y key for menu": PAUSE 0
1150 GO TO 1000
1999 REM Full catalogue
2000 PRINT #c;"Full catalogue"
2010 DIM f$(10): LET f$=z$(1)
2020 FOR i=1 TO n
2030 IF z$(i)=n$ OR z$(i, TO 10)
=f$ THEN GO TO 2060
2040 PRINT #c;f$( TO 10)
2050 LET f$=z$(i, TO 10)
2060 NEXT i
2065 PRINT #c;z$(n, TO 10)
2070 RETURN
2999 REM Complete sector list
3000 DIM f$(10): INPUT "Filename
 (or ENTER for all):",f$
3010 FOR i=1 TO n
3015 IF z$(i)=n$ THEN GO TO 3030
3020 IF f$=n$( TO 10) THEN GO SU
B 9500: GO TO 3030
3025 IF z$(i, TO 10)=f$ THEN GO
SUB 9500
3030 NEXT i
3040 RETURN
3999 REM Bad sector list
4000 PRINT #c;"Bad sector list"
4010 FOR i=1 TO n
4020 IF z$(i)<>n$ AND z$(i,13)>C
HR$ 127 THEN GO SUB 9500
4030 NEXT i
4040 RETURN
4999 REM Check file
5000 DIM f$(10): INPUT "Filename
? ";f$
5005 DIM x$(256): LET eof=-1: LE
T good=1
5010 FOR i=1 TO n
5020 IF z$(i, TO 10)<>f$ THEN GO
 TO 5100
5030 IF z$(i,13)>CHR$ 127 THEN G
O TO 5060
5039 REM good sector
5040 LET x$(CODE z$(i,11)+1)="y"
5050 GO TO 5080
5059 REM bad sector
5060 PRINT #c;"Record ";CODE z$(
i,11);" bad on sector ";CODE z$(
i,12)
5070 LET good=0
5080 LET a=CODE z$(i,13)
5090 IF a/2<>INT (a/2) THEN LET
eof=CODE z$(i,11)
5100 NEXT i
5110 IF eof>=0 THEN GO TO 5120
5111 REM missing EOF
5112 FOR i=250 TO 1 STEP -1
5114 IF x$(i)=" " THEN NEXT i
5116 LET eof=i-1
5118 LET good=0: PRINT #C;"No EO
F record"
5120 FOR i=0 TO eof
5130 IF x$(i+1)=" " THEN PRINT "
Record ";i;" missing": LET good=
0
5140 NEXT i
5150 IF good=1 THEN PRINT "File
";f$;" intact"
5160 IF good=0 THEN PRINT "File
";f$;" corrupted"
5170 RETURN
5999 REM Read a sector
6000 INPUT "Sector no.";s
6010 *F s CODE 60000
6020 IF c=2 THEN CLS
```

THE COMMAND TABLE

COMMAND	ACTION
*L ‹drive›	Gets the sector list into z$
*D ‹drive›	Sets the drive number for all the other commands.
*F ‹sector› CODE ‹location›	Loads the given sector into a given location. IX corresponds to the first location, so it requires 595 bytes.
*S CODE ‹location›	Saves the sector read into the location on the next free sector on the cartridge.
*E ‹sector›	'Removes' the numbered sector from the cartridge.

▼ This is the main assembler listing and should be entered using an assembler program. If you've not got an assembler to hand, you can use a Hex loader to type in the figures on the left-hand side of the listing.

```
8030             100         ORG  #8030 ;**new org**
8030 213A80      110         LD   HL,NEWVEC
8033 22B75C      120         LD   (VECTOR),HL ; alter vector
8036 010000      130         LD   BC,0
8039 C9          140         RET
803A C6CE        200 NEWVEC  ADD  A,206
803C FE2A        210         CP   "*"
803E C2F001      220         JP   NZ,#01F0
8041 D7          230         RST  #10
8042 2000        240         DEFW #20 ;next char
8044 F620        245         OR   #20 ;make it l.c.
8046 FE6C        247         CP   "l"
8048 C20082      248         JP   NZ,NVEC2 ;**new jump**
804B D7          249         RST  #10
804C 2000        250         DEFW #20 ;next char
                1055 *L+
                1056 ;
                1057 ;
80B1 CDF717     1060 L2      CALL MOTOR ;switch on
80B4 21FF00     1070         LD   HL,255 ;**new number**
80B7 22C95C     1080         LD   (SECTOR),HL
80BA CDA381     1090 FLOOP   CALL NXHDBF ;next header & buffer
80BD 00000000   1100         DEFB 0,0,0,0,0,0,0 ;**blank old code**
80C4 00000000   1110         DEFB 0,0,0,0,0,0,0
80CB 2840       1200 LESS    JR   Z,NEXT ;if not used
80CD 3810       1201         JR   C,ISBAD ;if 1st checksum fails
                1375 *L+
                1376 ;
                1377 ;
                1378 ;(rather different)
810D 21C95C     1380 NEXT    LD   HL,SECTOR
8110 35         1390         DEC  (HL)
8111 00000000   1400         DEFB 0,0,0,0
8115 20A3       1430         JR   NZ,FLOOP
                4999 *L+
                5000 ;
                5010 ; REPAIR KIT PART 2
                5020 ; STARTS HERE
                5030 ;
                5031 ; do Macro for 16K ROM calls
8200            5032 OLD     MAC
8200            5033         RST  #10
8200            5034         DEFW =0
8200            5035         ENDM
                5036 ;
                5040 ; further syntax checker
8200 F5         5042 NVEC2   PUSH AF
8201 CD9083     5045         CALL WATRM2 ;alter code
8204 F1         5047         POP  AF
8205 FE64       5050         CP   "d"
8207 2811       5060         JR   Z,SETDRV
8209 FE66       5070         CP   "f"
820B 281F       5080         JR   Z,FINDSC
820D FE73       5090         CP   "s"
820F CAAD82     5100         JP   Z,SAVSEC
8212 FE65       5110         CP   "e"
8214 CA0AB3     5120         JP   Z,ERASEC
8217 C3F001     5130         JP   #01F0 ;if none
                5140 ;
821A            5150 SETDRV  OLD  #20
821D CD1E06     5160         CALL EVALBC
8220 CDB705     5170         CALL CHKEND
8223 2AD65C     5180         LD   HL,(D_STR1)
8226 22FB83     5190         LD   (DRIVE),HL
8229 C3C105     5200         JP   #05C1 ;end of *D
                5210 ;
```

The first extra command handler is SETDRV, which handles the *D command simply by finding the value and putting it in DRIVE.

```
822C            5220 FINDSC  OLD  #20
822F CD1E06     5230         CALL EVALBC ;get sector no'
8232 FEAF       5240         CP   175 ;"CODE"
8234 C22800     5250         JP   NZ,#28
8237            5260         OLD  #20
823A ED43C95C   5270         LD   (SECTOR),BC ;sector no
823E CD1E06     5280         CALL EVALBC
8241 CDB705     5290         CALL CHKEND
8244 C5         5300         PUSH BC ;save destination
```

```
6090 PRINT #c;"Sector ";s
6100 IF PEEK 60000 THEN PRINT #c
; FLASH 1;"Not found": RETURN
6110 PRINT #c;"Cart name:";
6120 FOR i=44 TO 53
6130 PRINT #c;CHR$ PEEK (60000+i
);
6140 NEXT i: PRINT #c
6150 PRINT #c;"RECFLG:";PEEK 600
67
6160 PRINT #c;"RECNUM:";PEEK 600
68
6170 PRINT #c;"RECLEN:";PEEK 600
69+256*PEEK 60070
6180 PRINT #c;"Filename:";
6190 FOR i=71 TO 80
6200 PRINT #c;CHR$ PEEK (60000+i
);
6210 NEXT i: PRINT #c
6220 PRINT #c;"Checksum1:";PEEK
60081,
6230 IF PEEK 60011=PEEK 60081 TH
EN PRINT #c;"OK"
6240 IF PEEK 60011<>PEEK 60081 T
HEN PRINT #c;"(should be ";PEEK
60011;")"
6245 PRINT #c;"Checksum2:";PEEK
60594,
6250 IF PEEK 60012=PEEK 60594 TH
EN PRINT #c;"OK"
6260 IF PEEK 60012<>PEEK 60594 T
HEN PRINT #c;"(should be ";PEEK
60012;")"
6300 RETURN
6999 REM repair sector
7000 GO SUB 6000
7010 IF PEEK 60000 THEN RETURN
7020 PRINT '"Re-writing to spare
 sector"
7030 *S CODE 60000
7040 PRINT
7050 RETURN
7999 REM remove sector
8000 INPUT "Sector no.";s
8010 *E s
8020 PRINT "Sector removed"
8030 RETURN
9000 CLEAR 32815: LOAD *"m";1;"S
LC.3"CODE : RANDOMIZE USR 32816:
 RUN
9500 PRINT #c;z$(i, TO 10);" r";
CODE z$(i,11);TAB 16;"s";CODE z$
(i,12);TAB 21;
9510 LET f=CODE z$(i,13)
9520 IF f/2<>INT (f/2) THEN PRIN
T #c;"EOF";
9530 IF CODE z$(i,13)>127 THEN P
RINT #c;TAB 25;"BAD";
9540 PRINT #c
9550 RETURN
9999 CLEAR : ERASE "m";1;"repair
 2": SAVE *"m";1;"repair 2"
```

INTO ACTION

The menu has been extended to cover the extra operations; probably the most useful of these is 'Examine sector', which searches a cartridge for a given sector, and loads it (corrupted or not) into RAM for inspection. Lines 6000 onwards load the sector into locations 60000 on, revealing various details about it. Most important here are the checksums; if either of these are incorrect it means that the file of which it is a part will probably not load, and the sector should be repaired — which is exactly what option 6 does. You can usually tell if tape is physically damaged, because the checksum result will give a different value every time you read it.

A sector is repaired by it being read to address 60000 onwards; this is then written out on to the next available sector, with the checksums re-calculated. It's not, of course, written back on to the same sector as there's every chance that the actual tape is damaged at this point.

Once a sector has been fixed in this way, the 'bad' version should be

```
8245 210100     5310        LD   HL,1
8248 22DA5C     5320        LD   (N_STR1),HL ;name len
824B 2AFB83     5330        LD   HL,(DRIVE)
824E 22D65C     5340        LD   (D STR1),HL
```

The next routine is FINDSC, which handles the *F command. After syntax checking, an 'M' channel is created, and each sector examined until the required one is found — or until the sector counter expires. If the sector is found, then its particulars are stored in the said location; if not, then 255 is placed into the location instead. An exit is made via QUITM, which closes the channel before returning to the interpreter.

```
8251 CDE80F     5350 M2     CALL CREATM
8254 DD7E19     5360        LD   A,(IX+25)
8257 CDF717     5370 M6     CALL MOTOR ;turn on
825A 2AC95C     5380        LD   HL,(SECTOR)
825D DD750D     5390        LD   (IX+13),L ;save sector no
8260 21FF00     5400        LD   HL,255
8263 22C95C     5410        LD   (SECTOR),HL ;count
8266 CDC412     5420 DOAGIN CALL NEXTHD
8269 DD7E29     5430        LD   A,(IX+41) ;sector loaded
826C DDBE0D     5440        CP   (IX+13) ; is it wanted?
826F 280C       5450        JR   Z,GOTIT ;if its the one
8271 21C95C     5460        LD   HL,SECTOR
8274 35         5470        DEC  (HL)
8275 20EF       5480        JR   NZ,DOAGIN ;do 255 times
8277 E1         5490        POP  HL ;destination
8278 36FF       5500        LD   (HL),255 ;'not found'
827A C36B83     5505        JP   QUITM
827D DDE5       5530 GOTIT  PUSH IX
827F E1         5540        POP  HL
8280 114300     5550        LD   DE,#43
8283 19         5560        ADD  HL,DE ;HL=RECFLG
8284 CDA918     5570 M10    CALL RDBYTS
8287 010E00     5580        LD   BC,#E
828A CDCC81     5590        CALL CHKSUM
828D DD770B     5600        LD   (IX+11),A
8290 110F00     5602        LD   DE,#0F
8293 19         5603        ADD  HL,DE
8294 010002     5604        LD   BC,#200
8297 CDCC81     5605        CALL CHKSUM
829A DD770C     5606        LD   (IX+12),A
829D DD360000   5610        LD   (IX+0),0 ;'found'
82A1 DDE5       5620        PUSH IX
82A3 E1         5630        POP  HL
82A4 D1         5640        POP  DE ;destination
82A5 015302     5650        LD   BC,595
82A8 EDB0       5660        LDIR ;copy whole buffer
82AA C36B83     5665        JP   QUITM
                5700 ;
                5710 ; save data on next free sector
82AD            5720 SAVSEC OLD  #20
82B0 FEAF       5730        CP   175 ;"CODE"
82B2 C2F001     5740        JP   NZ,#01F0
82B5            5750        OLD  #20
82B8 CD1E06     5760        CALL EVALBC
82BB CDB705     5770        CALL CHKEND
82BE ED43FD81   5780        LD   (FMARK),BC ;store source
82C2 210083     5790        LD   HL,SILLNM
82C5 22DC5C     5800        LD   (T_STR1),HL
82C8 010A00     5810        LD   BC,10
82CB 22DA5C     5820        LD   (N_STR1),HL
82CE 2AFB83     5830        LD   HL,(DRIVE)
82D1 22D65C     5840        LD   (D_STR1),HL
```

Routine SAVSEC handles the *S command and, again, it starts by opening an 'M' channel with a silly filename that should never exist on the cartridge. A full cartridge is tested prior to the data being written on to the next free cartridge, with the ROM routine WRBUF handling most of the tricky stuff ... including doing the checksums.

```
82D4 CD291B     5850 M1     CALL OPENM
82D7 DD6E1A     5860        LD   L,(IX+26)
82DA DD661B     5870        LD   H,(IX+27)
82DD 0620       5880        LD   B,32
82DF 7E         5890 FULL?  LD   A,(HL)
82E0 FEFF       5900        CP   #FF
82E2 2005       5910        JR   NZ,ISSPAC ;if at least 1 free sector
82E4 23         5920        INC  HL
82E5 10F8       5930        DJNZ FULL?
82E7 E7         5940        RST  #20
82E8 0F         5950        DEFB #0F ;"Microdrive full"
82E9 DDE5       5960 ISSPAC PUSH IX
82EB E1         5970        POP  HL
82EC 014300     5980        LD   BC,67
82EF 09         5990        ADD  HL,BC
82F0 EB         6000        EX   DE,HL ;DE=RECFLG
82F1 2AFD81     6010        LD   HL,(FMARK)
82F4 09         6020        ADD  HL,BC ;source+67
82F5 011002     6030        LD   BC,595-67
82F8 EDB0       6040        LDIR ;copy into buffer
82FA CD3D12     6050 M4     CALL WRBUF ;send it
82FD C36B83     6070        JP   QUITM
8300 00010203   6090 SILLNM DEFB 0,1,2,3,4,5,6,7,8,9 ;silly filename
                6100 ;
                6110 ; remove an individual sector
830A            6120 ERASEC OLD  #20
830D CD1E06     6130        CALL EVALBC
8310 CDB705     6140        CALL CHKEND
8313 ED43FD81   6150        LD   (FMARK),BC
```

'removed' from the cartridge; there's not much point in freeing the faulty sector for further use. Option 7 achieves this by marking it with a strange filename full of CHR$ 0s. That done, the next time you ask for a sector list of the cartridge you'll get a bad sector with the name '??????????'; this is normal, so don't try to delete it again. The strange name will not show up in a normal CAT. As much of the utility is in Basic, you can reconfigure it to suit, using the extra commands provided; check out the table of commands given with this article.

CODE CONSIDERATIONS

For those blessed with an assembler, it's obviously a bit easier to enter the assembly listing, rather than the accompanying Hex. The listing, in fact, is a bit strange for two reasons. First, it's fragmented, consisting initially of the modifications made to the code in Running Repairs. As the original line numbers were chopped from my listing (ha! — at last something I *can* blame on someone else) the position of each modification may not be clear. To help, I've included at least one label in each block. The only one that's a bit vague is the main extra section ... it should go directly after TEMPA in the code in Running Repairs. The '*L+' commands in the listing are assembler directives, and should be ignored.

The second odd thing about the listing is that it uses a 'macro'. I've used one called OLD to make it clearer when calling 16K ROM routines with the 8K ROM in place. The usual way to call a routine is with two instructions — namely a RST#10 followed by a DEFW — and this is not exactly crystal clear; with the macro defined, a much clearer command (such as OLD#20) can be used. Currently, the only assembler that allows macros is the one from Hisoft — if you use another, simply replace it with the more long-winded version. (I cannot claim any originality for this idea. The shadow ROMs were written by Sinclair Research using a similar macro, named OLDCAL, but the Hisoft assembler doesn't allow long macro names.)

And now for the code itself. To begin with, there's a mod allowing the additional routines to be accessed — by alteration of the JP instruction. The other mods are to do with getting around the 'missing sector' problem, and the DEFB 0s are there to pad out the code so that it ends up pretty much like the code you saw in Running Repairs.

If you have a look at the code, you'll see the macro definition, and that's followed by the new syntax checker. Check out the listing itself for further documentation.

Anyway, that's about it. With this little lot, you should be able to reclaim at least some of your unloadable files. The existing program does not alter corrupt data from sectors — only the checksums — and you could add a nice little editor around line 6020 to do just that. Sorry for the long wait between the two parts of this article ... let's hope I don't have to wait so long for you to come up with an editor at line 6020! YS

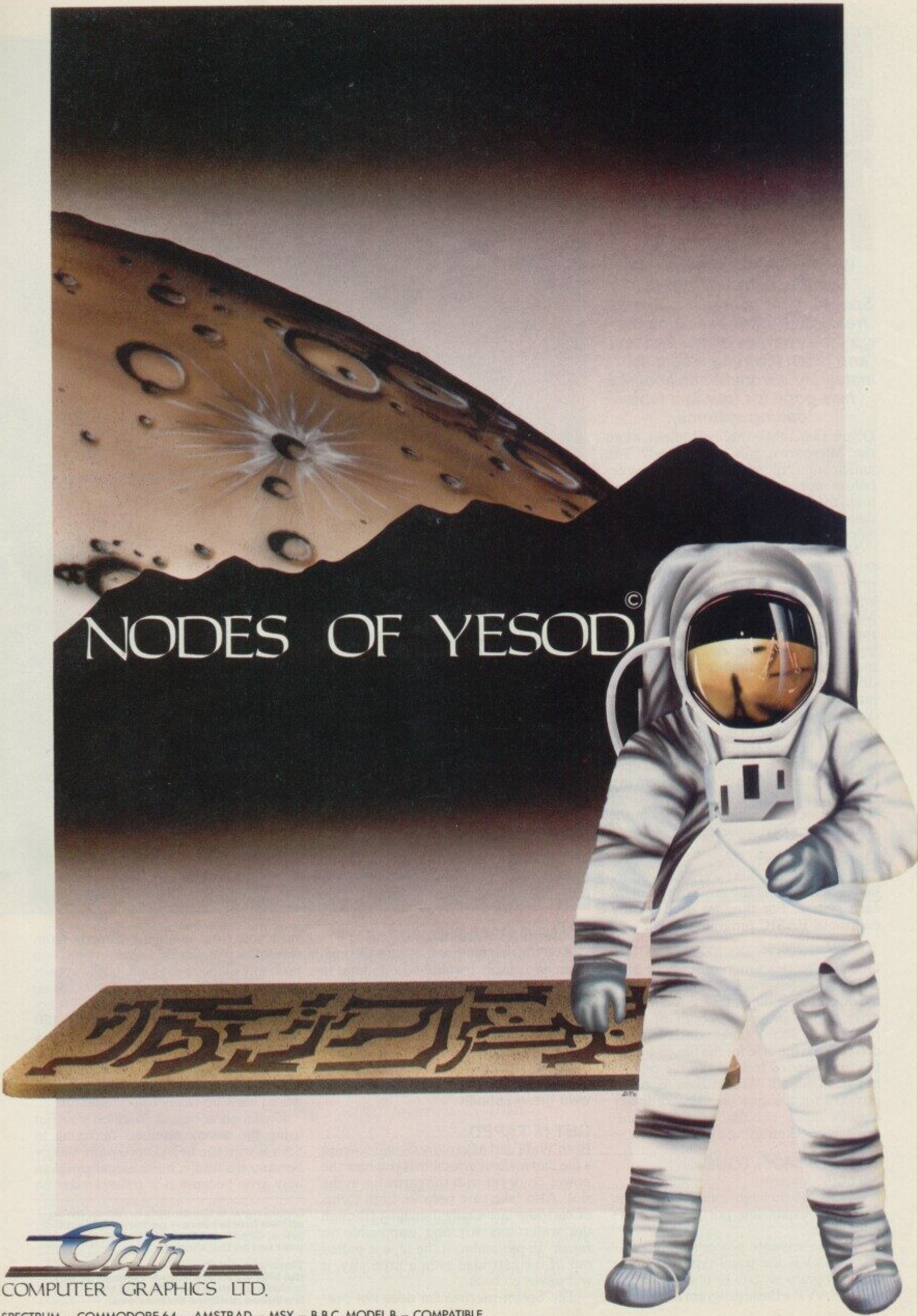
```
8317 210083    6160         LD   HL,BILLNM
831A 22DC5C    6170         LD   (T_STR1),HL
831D 010A00    6180         LD   BC,10
8320 22DA5C    6190         LD   (N_STR1),HL
8323 2AFB83    6200         LD   HL,(DRIVE)
8326 22D65C    6210         LD   (D_STR1),HL
```

The code at ERASEC handles the *E command, by searching for the required sector in a similar way to FINDSC. When it's found, a null filename is written out to it, along with a bit that shows the sector is being 'used'; thus, it's removed from use.

```
8329 CDE80F    6220 M3      CALL CREATM
832C DD7E19    6230         LD   A,(IX+25)
832F CDF717    6240 M7      CALL MOTOR ;switch on
8332 DBEF      6250         IN   A,(#EF)
8334 E601      6260         AND  1
8336 2002      6270         JR   NZ,NPROT
8338 E7        6280         RST  #20
8339 0E        6290         DEFB #E ;"Write protected"
833A 21FF00    6300 NPROT   LD   HL,255
833D 22C95C    6310         LD   (SECTOR),HL
8340 CDC412    6320 ERALP   CALL NEXTHD ;next sector
8343 3AFD81    6330         LD   A,(FMARK)
8346 DDBE29    6340         CP   (IX+41)
8349 202A      6350         JR   NZ,NOTWON
               6360 ; this is the sector
834B 3EE6      6370         LD   A,#E6
834D D3EF      6380         OUT  (#EF),A ;signal 'write' to ULA
834F CD7D83    6390         CALL CLRBUF
8352 016801    6400         LD   BC,#0168
8355 F5        6410         PUSH AF
8356 0B        6420 WAITBC  DEC  BC
8357 78        6430         LD   A,B
8358 B1        6440         OR   C
8359 20FB      6450         JR   NZ,WAITBC
835B F1        6460         POP  AF
835C 00        6470         NOP  ;after a delay
835D DDE5      6480         PUSH IX
835F E1        6490         POP  HL
8360 113700    6500         LD   DE,#37
8363 19        6510         ADD  HL,DE ;preamble
8364 CD7818    6520 M5      CALL WRBIT ;send it
8367 3EEE      6530         LD   A,#EE
8369 D3EF      6540         OUT  (#EF),A ;put 'write' off
836B DDCB1886  6550 QUITM   RES  0,(IX+24)
836F CDA912    6560 M11     CALL CLOSEM
8372 C3C105    6570         JP   #05C1 ;end of *E
8375 21C95C    6580 NOTWON  LD   HL,SECTOR
8378 35        6590         DEC  (HL)
8379 20C5      6600         JR   NZ,ERALP
837B 18EE      6610         JR   QUITM ;if cant find it
837D DDE5      6620 CLRBUF  PUSH IX
837F 060A      6630         LD   B,10
8381 DD364700  6640 CLBLP   LD   (IX+71),0
8385 DD23      6650         INC  IX
8387 10FB      6660         DJNZ CLBLP ;make null filename
8389 DDE1      6670         POP  IX
838B DDCB46CE  6680         SET  1,(IX+70) ;mark it 'used'
838F C9        6690         RET
               7000 ;
               7010 ; alter part 2 for different ROMs
8390 21A383    7020 WATRM2  LD   HL,OLD2
8393 3ADA16    7030         LD   A,(#16DA)
8396 060B      7040         LD   B,11
8398 FEFF      7050         CP   #FF
839A CA6C80    7060         JP   Z,REDOLP
839D 21CFB3    7070         LD   HL,NEW2
83A0 C36C80    7080         JP   REDOLP
```

The final routine is WATRM2, and this does what's necessary to ensure that the program works on all types of ROM. As far as this program is concerned, there's no difference between versions 2 and 3, so no extra steps are taken for the latter version of the Interface 1 ROM. You'll also find that the code given in Running Repairs also works fine on the third version of the ROM.

```
               7090 ; data for old ROM
83A3 D582291B  7100 OLD2    DEFW M1+1,OPENM
83A7 5282E80F  7110         DEFW M2+1,CREATM
83AB 2A83E80F  7120         DEFW M3+1,CREATM
83AF FB823D12  7130         DEFW M4+1,WRBUF
83B3 65837818  7140         DEFW M5+1,WRBIT
83B7 5882F717  7150         DEFW M6+1,MOTOR
83BB 3083F717  7160         DEFW M7+1,MOTOR
83BF 6782C412  7170         DEFW DOAGIN+1,NEXTHD
83C3 4183C412  7180         DEFW ERALP+1,NEXTHD
83C7 8582A91B  7190         DEFW M10+1,RDBYTS
83CB 7083A912  7200         DEFW M11+1,CLOSEM
83CF D582051B  7210 NEW2    DEFW M1+1,#1B05
83D3 5282A510  7220         DEFW M2+1,#10A5
83D7 2AB3A510  7230         DEFW M3+1,#10A5
83DB FB822213  7240         DEFW M4+1,#1322
83DF 65B3B315  7250         DEFW M5+1,#15B3
83E3 58823215  7260         DEFW M6+1,#1532
83E7 30833215  7270         DEFW M7+1.#1532
83EB 6782A913  7280         DEFW DOAGIN+1,#13A9
83EF 4183A913  7290         DEFW ERALP+1,#13A9
83F3 8582EB15  7300         DEFW M10+1,#15EB
83F7 70838E13  7310         DEFW M11+1,#138E
```


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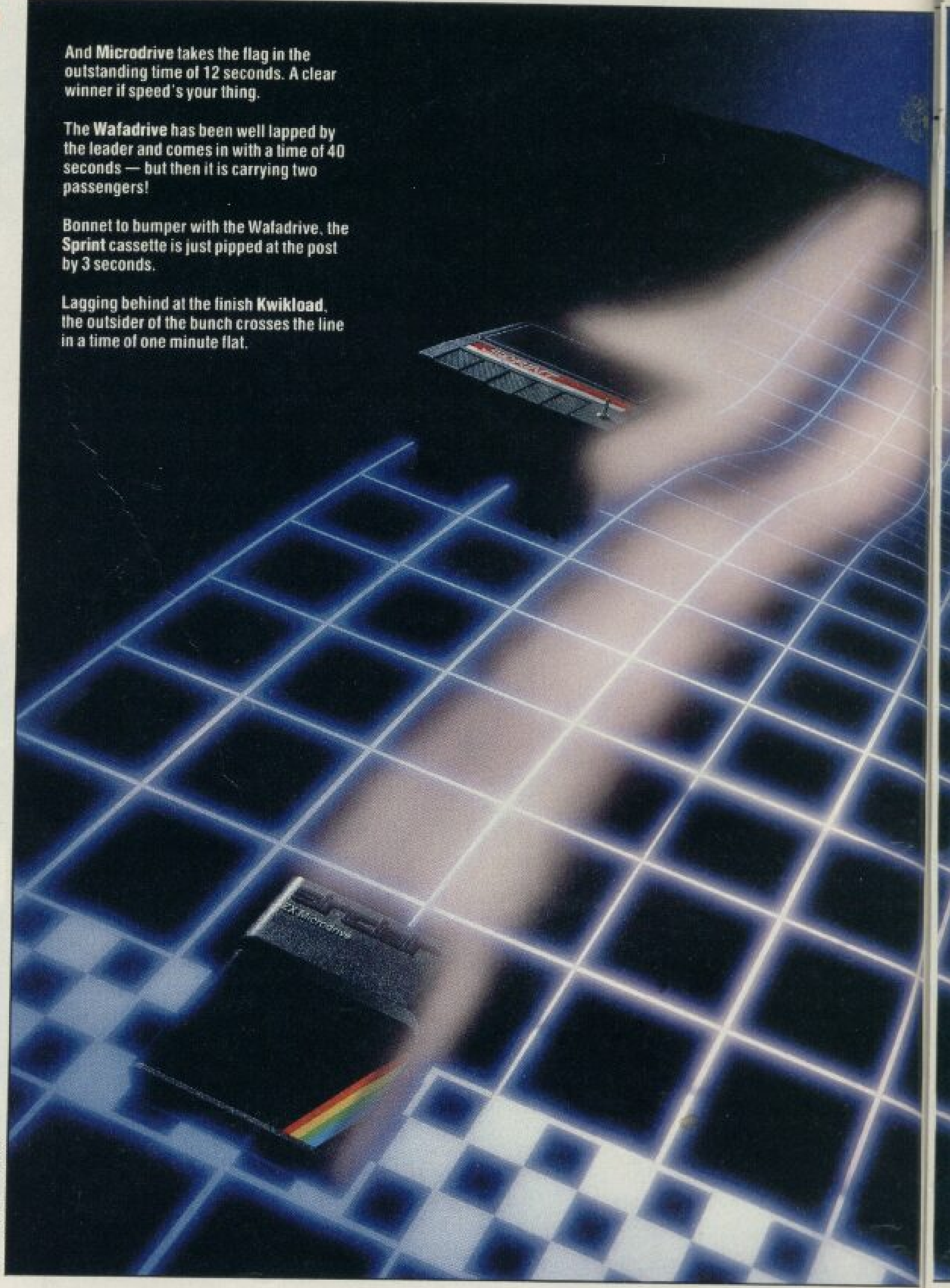
SPEED TRIALS

What's slower than the C5? Loading software into the Spectrum, of course. So, speed freak, SQ Factor has stuck the go-faster stripes on his Speccy, and taken it out for a spin. But instead of aerodynamic spoilers he's gone for four fast tape loading systems.

D'you remember the excitement when the Microdrive was announced? The anticipation of speed — times never before achieved on the Speccy. And then, the long haul between promise and delivery of the first not-quite-perfect Microdrives.

Now you no longer have to wait an age for them and the original, ridiculous price of the cartridges has come down to an almost reasonable two notes. But the Microdrive is no longer the only way of super-charging your Spectrum. Without going the whole hog and splashing out more than the computer cost on a disk drive, you can LOAD at high speed in a number of ways — and as you'd expect *YS* has the dope. So, we told the dope to draw up a chart of all the info you need to help you in your search for speed.

Our chart was prepared so you can compare the features of each system in a quick and easy to follow way. Everything that cannot be compared directly in the chart is discussed separately.



And Microdrive takes the flag in the outstanding time of 12 seconds. A clear winner if speed's your thing.

The **Wafadrive** has been well lapped by the leader and comes in with a time of 40 seconds — but then it is carrying two passengers!

Bonnet to bumper with the Wafadrive, the **Sprint** cassette is just pipped at the post by 3 seconds.

Lagging behind at the finish **Kwikload**, the outsider of the bunch crosses the line in a time of one minute flat.

GEORGE LOGAN

TIME CHECKS

The times in the chart were derived by saving and loading the same program on each system. For this, we used a truly enormous BASIC program to wit:

```
10 DIM a$(35000)
```

Once RUN, this program is about 35K Bytes long! Several LOAD times were averaged to get the times for the Microdrive and Wafadrive — both of these require an 'access time' which lets the drive search the tape for the file, as well as the time needed to load the file once it has been found. Access time is not a problem for the systems using ordinary cassette tapes. The times for the Wafadrive were taken using a 64K wafer.

THE COMMON TOUCH

All of the systems:

- Have a full through connection to the Spectrum expansion port — or don't obstruct it.
- Need no separate power supply.
- Can SAVE the usual types of Spectrum program or data or code.
- Can SAVE a Basic program to autorun — though Kwikload is a struggle.

And the one feature that runs through them all is tape. I would recommend in every case that you keep backup copies in the standard tape format. You could get caught out if you rely totally on any of these systems to hold your important bits. Each system has plenty of opportunity for operator error to cause loss of data, and of course, fast moving tape will wear out eventually.

GET IT TAPED

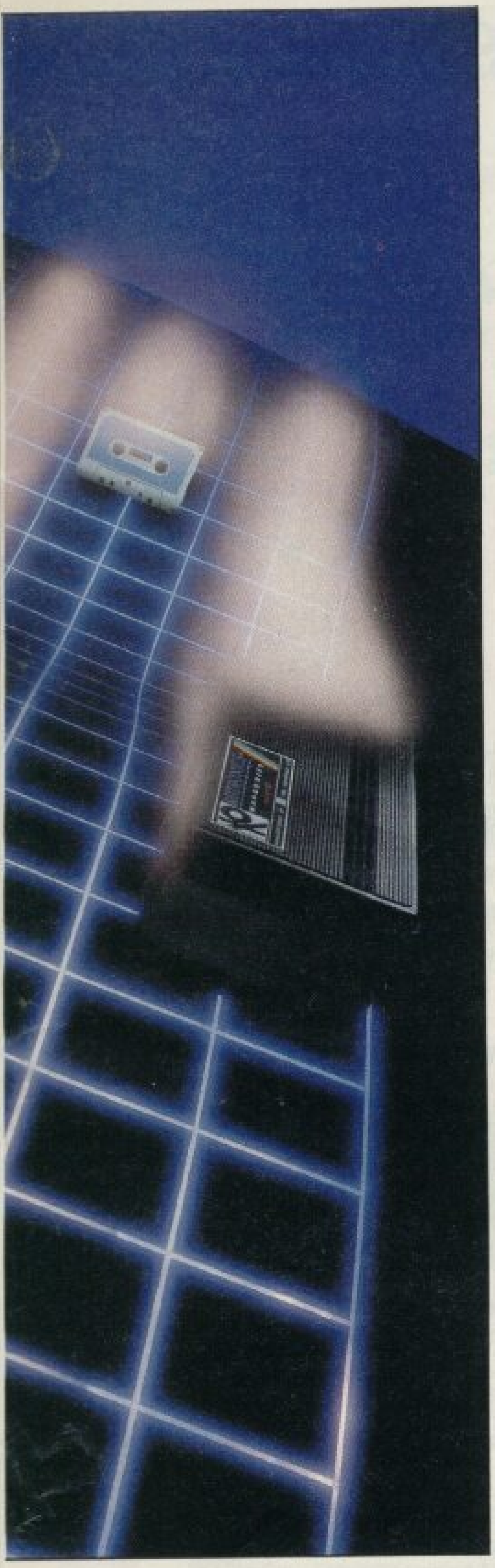
Both Wafa and Micro drives can corrupt a file and make it unusable if you turn the power on or off with the cartridge in the slot. Also take care because both forms of cartridge are easily damaged (though the wafer less so) and impossible to repair. In particular, if the tape is pulled out of the cartridge even a little way, it will never go back.

The Sprint mechanism does not prevent you from changing directly from rewind to play, and if you do so you will probably damage the tape, as the speeds involved are higher than normal. You are warned always to use stop between functions, but it would have been better if this was built into the hardware rather than left to the user's memory. This format is standard format (just played faster) but I would still use an ordinary cassette recorder to back up really important stuff.

Kwikload is bound to catch you out using the wrong numbers or trying to SAVE with the LOAD program, simply because it's fiddly, but a bigger problem may arise because it is trying to do too

Listed right is the complete run-down on all four fast loaders — performance and price. Check out the spec before placing your bet on the winner.

Timings for Wafadrive were taken using the 64K wafer Kwikload. Timings do not include the time taken to load the Kwikload routines themselves.



POLE POSITIONS

SINCLAIR MICRODRIVES

The original Microdrives may not be the best, but they are the fastest system reviewed and what's more they are now reasonably priced. It's also worth noting that software producers have been known to write for them sometimes. The occasional lost file and the 'full memory' bug have stopped me putting my Microdrives to serious use — but I have been known to lose files on a disk computer, so I mustn't be too hard on Sinclair.

The 'full memory' bug causes a crash if a large BASIC program is LOADed or even a small one if the RAMTOP has been moved down. This is caused by the Microdrive's shadow ROM not checking properly if there is space for both the program and a 500 byte Microdrive channel before LOADing. This can be bad news as it crashes with the drives running, which can corrupt the tape when you switch off.

Further evidence of 'dickiness' is the fact that microdrive cartridges format to a different size (in the region of 90K) each time you format them. You may have been advised to format repeatedly until you get the largest number possible, but I believe that the few extra K are suspect. The whole exercise may merely fool your drives into using part of the tape which is on the edge of reliability.

You can connect up to eight drives to a Spectrum via Interface 1, but you only get one in the starter package. Still, you also get an RS232 port suitable for a printer (but not usable with a full duplex modem), and the Spectrum network ports. It's said that these will now pass data with the latest version of the QL.

On the language front, Microdrive syntax is unnecessarily tortuous, with no defaults and lots of needless punctuation required. You have to specify drive 1 even if you only have the one. Wouldn't it be simpler if number one was assumed to be present (rather than the network, say) unless you told it otherwise? You would save six symbols, many of them needing two keys for the commands you are likely to use most often with Interface 1.

Instead of LOAD *"m;l; why not use LOAD 1 for the drive and LOAD n for the network? That would activate the error routine to page in the shadow ROM just as well as * does. Microdrives were long enough coming that these rough edges should have been knocked off well before they were inflicted on you and me. OK, you may think I'm going on a bit, but it's a fact that the drives take less time to LOAD a program than it takes me to type in a command telling them to do it! There is a saving grace though — you can have a program named "run" which will LOAD and RUN just by entering the keyword RUN.

ROTRONICS WAFADRIVES

The first thing you notice with Wafadrives is that you get two drives as standard. You also get a bonus of RS232 and Centronics ports. This must make them a better buy than a single Microdrive plus Interface 1 at the same price.

The wafers themselves are now more expensive than Micro-cartridges, but they come in three sizes, 16K, 64K, and 128K; and the largest one has greater capacity than a Microdrive cartridge. The wafers are also physically larger and more robust than Micro-cartridges, with a sliding door to protect the tape when it is removed from the drive. The access time varies according to the size of the wafer. The shortest for the 16K version was 6.5 seconds (worst case) as opposed to 45 seconds (worst case) for the 128K wafer. If you're after speed then go for the shorter tapes, always provided they're big enough to hold your program.

There is a word processor program in the package but this is probably the only software you will ever find especially written for use with the Wafadrive. However, Rotronics have converted a number of games to wafers. Transferring tape programs onto wafer is no more difficult than with the Microdrive. However, you'll use at least 2K RAM with the wafer system instead of the half K needed for a Microdrive channel. This will almost certainly make it impossible to wafer many of the larger games.

Wafer syntax is less of a mouthful than the Microdrive's as defaults are

THE 35K GRAND PRIX

	MICRODRIVE	WAFADRIVE	SPRINT	KWIKLOAD
Time to LOAD 35K	12 seconds	40 seconds	43 seconds	60 seconds
System Price	£99.95	£99.95	£64.95	£ 4.95
Media Price	£ 2.00	£ 3.65	£ 0.50	£ 0.50
Media Capacity	Approx. 90K	16K, 64K, or 128K	1300K (120 min. cassette)	3900K
Programs Available in this Format	Some	Some	Almost all!	None
RAM Used by System	600+ Bytes	2K+ Bytes	None	220 Bytes
Simplest Case Syntax	LOAD *"m";1;"name"	LOAD *"name"	LOAD ""	RANDOMISE 23552=35000+USR 653000
Time to FORMAT	35 seconds	2½ Minutes	N/A	N/A
Approximate Actual Transfer Speed	121 Kilobaud	18 Kilobaud	6000 Baud	4500 Baud
Worst Case Access Time	8 seconds	23 seconds	N/A	N/A
Size of Manual	61 page booklet	68 page spiral bound	6 page leaflet	18 page booklet
Major Plus	Fastest	Most for Money	Most Compatible	Cheapest
Extras	Four programs on two cartridges + demo + blank	Word processor plus 3 blank wafers	Off-line Switch costs £5 extra	Header reader

Gemini for the 48K Spectrum

Bumper Packs

Business Bumper Pack

VAT Records

Profit & LossA/C and Balance Sheet

Trial Balance

Cash Book

Petty Cash

Bank Account

C.0415 £24.95

The best in the business! Written by businessmen for businessmen, Gemini's board of Directors contains three Chartered Accountants, and their accounting software brilliantly maximises the potential of the 48K Spectrum for commercial use.

Containing a professional standard manual, the Bumper Pack is in fact a COMPLETE CASH BOOK ACCOUNTING SYSTEM replacing ALL manual records, and is ideal for the cash based business. You can transfer all receipts and expenditure records to the computer, together with Bank Account, Petty Cash records, and all VAT transactions. The system also supports 90 nominal accounts! Summaries are then prepared by the 48K, listing all the information which would normally take hours of tedious manual bookeeping... in a fraction of the time. Gemini's Cash Book Acounting System is even used by Chartered Acountants for incomplete records.

Having prepared these summaries, and a Trial Balance, the software then allows you to add details of year end adjustments, such as Depreciation, Bad Debts, Creditors and Debtors, and prepares a full Balance Sheet and Profit & Loss Account. It even produces COMPARATIVE figures, such as budgets or previous years' results, alongside the current year's figures, together with notes to the accounts.

Written to the same specification as Gemini's widely acclaimed Accounting Systems for the BBC Micro and the Commodore 64, this BUMPER PACK for the Spectrum 48K represents quite remarkable value for money, and could easily save its cost in the first week of use! Business decisions can be made more quickly and profitably, based upon accurate, up to the minute, computer data, and vital management information is available from your 48K at the touch of a key.

Suitable for Sole Traders, Partnerships and Limited Companies.

MICRODRIVE COMPATIBLE

Also available for the following machines:

BBC Micro		
Cassette	C.0405/6	£119.90
40 track disk	C.0405/6/40	£119.90
80 track disk	C.0405/6/80	£119.90
Commodore 64		
Cassette	C.0818	£89.95
Disk	D.0818	£99.95

"Independent Press Comments"

"Remarkable software, friendly and well designed, a pleasure to use."
— **Gemini Cash Book, The Scotsman 12/8/83**

"Will enable business people with a moderate grasp of accounting principles to produce a set of figures that will satisfy both the bank manager and the Tax man."
— **Gemini Cash Book, Micro User, August 1983**

Home Software Bumper Pack

Contains the following programs, all cleverly and excitingly written to STRETCH the 48K to the limit... the ideal follow up to leisure software to truly exploit the Micro's potential for ALL the family (including Mother!).

C.0417 £24.95

Database: The Gemini Database Management System is a program designed to enable the user to store all types of information in similar format to a card indexing system. The program will ask you for the headings under which you wish to store the information on a 'card', i.e. for a record collection database these might be 'Artist', 'Song', 'Composer', etc., or for example in a database set up for a deep freezer, 'Use by date', 'Value', 'Type of food', 'Shelf', etc.

Having set up your fields, you may then add, delete or change information on the 'cards' under the headings you have elected. Gemini databases contain other important and useful utilities as well, e.g. alphabetical and numerical sorting, numeric calculations, finding records that meet specific requirements, line printer routines, browsing facilities, etc. For example a list of all recordings by a particular composer, calculate total value of freezer contents, etc.

Mailist: Gemini's Mailist program will enable you to keep a record of names and addresses and then print, examine, sort and find them, all with special selection techniques, containing our exclusive 'SEARCHKEY' system, giving you the option of creating your own dedicated coding system for each name on file. For example, on most mailing list systems, you are only given the standard heading such as name, street, town, country, postcode etc. With the Gemini searchkey system, you could find, say, all names on the file that are companies having a turnover in excess of '50,000' or all names that are subscribers who are behind in their subscriptions or all names that are eligible for a Christmas card this year!

A full and useful range of routines is included in the menu, and the program allows you to set up your own format for printing labels, i.e. the tab settings you require and spaces between labels, etc. Multiple copies can also be printed.

Graph Plot: Provides an easily assimilated visual representation of numerical data. For example monthly sales statistics comparing two year's results may be instantly converted into two side by side pie charts, histograms or graphs... for easier visual comparison and assimilation. It is particularly recommended where any kind of mathematical plotting facility is required.

Home Accounts: Designed as a complete Home Accounting package, this program allows the user to set up a budget for items of household expenditure and compare actual expenditure with budget. A running total of all surpluses and deficits is available both as digits, and in the form of a bar chart.

A complete Bank account routine is included, together with suggested expenditure categories such as mortgage, rent, rates, telephone, gas, electricity, etc. However, these may be deleted or augmented without difficulty.

Available from:

Larger branches of Boots and W.H.Smith and most good software dealers... or phone Gemini for prompt despatch quoting your Access, Visa, or American Express card number. Telephone (0395) 265165. Alternatively make your cheque or Postal Order payable to Gemini Marketing Ltd., amd send to Gemini Marketing Ltd., 18a Littleham Road, Exmouth, Devon EX8 2QG.

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Credit Card No. Access/Visa/American Express (delete) ....

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used, so you don't have to specify which drive you are using in every command. Also, fewer punctuation marks are required. (*There's just no stoppin' it. Ed.*)

CHALLENGE SPRINT

This is a fast LOADer that takes standard tape software. It is the ideal solution if you just want to get stuck in pronto without delving into the mysteries of protection busting to transfer tapes onto a faster medium. Even headerless LOADs will work with the Sprint, though be warned, it can't cope with the now common turboload.

The price is the lowest of the hardware speed-ups, and it only needs the common cassette. The syntax is also the least fussy of those reviewed — the same as for ordinary tape. On top of this, programs SAVEd on the Sprint can be LOADed (at ordinary speed) by a standard cassette player. Total compatibility at a reasonable price means a critic struck dumb when trying to find a winge to put in the minus column. However, we at YS try harder (*or else! Ed.*), so I'll note that the cassette unit has a tinny feel, quite out of place in an item made of plastic. Just don't drop it and you'll be all right. Early models wouldn't work with some other peripherals, notably the Microdrive, but the latest version can be switched out of the memory map to avoid trouble.

This unit had the tichiest manual of the lot, but that's no problem. What further instructions do you need?

KWIKLOAD

Now to the real cheapie — a turboloader of your very own. Of course, at this price you'll have to put up with a few drawbacks. Firstly, you'll obviously have to LOAD this tape in the standard format before you can use the routine to do fast LOADs. Secondly, it has a really user-violent syntax made-up mostly of numbers which have to be worked out, even for Basic LOADs. Thirdly, it will be less reliable than the hardware upgrades because it is pushing a standard cassette recorder to its limits. And lastly, it is the least fast of the methods we've looked at.

On the plus side, the routines occupy only 220 Bytes, it uses ordinary (but not cheapo) cassettes, the speed is a useful trebling of the standard rate, and since you are likely to be using the same tape machine for SAVE and LOAD, the reliability should be better than with the commercial fastloading games. And don't forget that it costs less than a tenth of the price of the Sprint.

Probably the best use for Kwikload is to make turboloading copies of your favourite games rather than doing frequent backups while developing your own programs. For this purpose, the cassette contains a header reader as well, to help you ferret out the addresses needed to make such copies. There are separate programs for loading and saving, and the whole business of making fast loading copies in the first place is fiddly and time consuming. Still, the end result is a tape that has the tricky bits in a short Basic header program. So in practice, once you've done the hard work, you can just use LOAD "" to get your program to turboload.

SPEED TRIALS

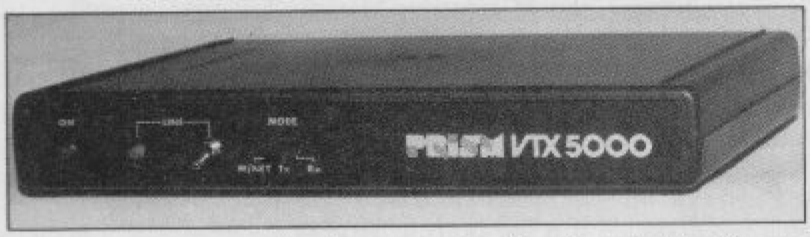
much with standard hardware. Unlike the Sprint, which physically runs the tape faster to get its speed, Kwikload crams three times as much data onto the same length of tape. This pushes the average cassette recorder to its limits, and you will need good tape to get away with it.

TO WIND UP . . .

Used in accordance with the instructions, any of the systems will give you much faster loading than you are used to, and reasonable reliability. The Wafadrive and Microdrive have the advantage of disk-like operating systems which start the motor and find files without you having to mess with play, record and rewind controls. This is a definite plus and makes up for having to cough up more for the cartridges. A few bitter experiences with the Microdrive bias me towards recommending the Wafadrive or the Sprint, but if you're after speed then the Microdrive must be a contender. More speed than this can only come from disks but that is another subject, and one that we'll explore when we're all rich. Let us know if it happens to you! YS

YOUR SPECTRUM MODEM OFFER

Dial yourself up a great deal — save £££s on a Prism VTX 5000 modem!



Have you ever wanted to have a peek at Prestel, chat to friends on a Bulletin Board or access one of the big databases? You have. Then *YS* has some good news for you! Now you can save £££s on our special modem offer, exclusive to *YS* readers.

We're offering the Prism VTX 5000 modem at the exceptional price of £49.95, plus £3.95's worth of user software absolutely free. And that's not all — you'll also receive a free quarter's subscription to Micronet 800 and Viewfax. Purchase the complete package and a whole new world will immediately open up to you.

The VTX 5000 is a smart black box that'll sit neatly under your Speccy. And because it doesn't need its own power supply, there's only one lead between you and the outside world. The modem is BT approved and provides 1200/75 baud.

Even better, your new modem can save you money. Think of all that free software just waiting to be downloaded into your computer. And all for the cost of a local phone call.

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I want to tap the power of my telephone, so rush me my Prism VTX 5000 modem.

I enclose a cheque for £49.95 for each modem, made payable to **MODEM HOUSE** and I realise that this all time low price includes the user to user software worth £3.95.

Name ....

Address ....

....

.... Postcode ....

Complete the coupon (or a photocopy of same) and send it with your cheque or Postal Order to **Modem House, Iolanthe Drive, Exeter, Devon EX4 9EA**. Please allow 28 days for delivery.

SPECTRUM ADVENTURES

There's an eerie tapping in the hollow halls of *Castle Rathbone*. It's the *Green Goblin*, Peter Shaw moving from room to room....

Welcome adventurers. I'm back this month with a program that combines everything we've covered so far. When you've typed it in, you'll have a complete scenario you can wander around in. As yet, there's nothing to pick up, and no monsters to attack but introducing them at this point would only lead to confusion.

So, what have we got? If you've been following our progress, you'll recognise the routines used in the program. Spot our old friend the command recognition routine as well as the concept of the Z() array. The new material is the location description routine and the outside lines that stop the whole program coming apart at the seams.

At this point, it's probably a good idea to sit down with your Speccy and start tapping in the listing.

Done that? Jolly good. Taking the program from the top you'll have noticed that the Z() array is only called once, at the beginning. That's why I've tucked it away in a subroutine right at the end of the program. Our next step is to call the location description routine which is also tucked away so that it doesn't interfere with the rest of the program. Now, you've probably already spotted where your location is held throughout the program but just in case, it's in P. The location description routine uses this info, jumps to the right part of the code and displays the correct description. Couldn't be simpler!

One last look at the command recognition routine. Yes, it's still got the amazing vocabulary of six words — North, South, East, West, Stop and Quit — but you should be about ready to start expanding it on your own now.

Next month I've got the feeling we're going to run across some of the nastier denizens of the adventurer's world, like ghosties and ghoulies and monstaaaaaagh!

```
  10 REM YS ADVENTURE ROTUINE 3
  20 POKE 23658,8
  30 GO SUB 9000: REM ROOMS
  40 GO SUB 8000: PAUSE 100: REM ROOM DESCRIPTION
  50 INPUT "What do you want to do now,      O gre
at one?",A$
  60 FOR A=1 TO LEN A$
  70 IF (A$(A)<"0" OR A$(A)>"9") AND (A$(A)<"A" O
R A$(A)>"Z") THEN  LET A$(A)=" "
  80 NEXT A
  90 FOR A=1 TO LEN A$
 100 IF A$(A)=" " THEN  LET C$=A$( TO A-1): LET A
$=A$(A+(1 AND (A+1)<=LEN A$) TO ): GO TO 120
 110 NEXT A: LET C$=A$
 120 IF C$="STOP" OR C$="QUIT" THEN  STOP
 130 IF LEN C$>0 AND LEN C$<=5 THEN  IF C$="NORTH
"( TO LEN C$) AND Z(P,1)=0 THEN  PRINT '"THERE'S
NO EXIT NORTH!"
 140 IF LEN C$>0 AND LEN C$<=5 THEN  IF C$="NORTH
"( TO LEN C$) AND Z(P,1)<>0 THEN  PRINT '"OK": LE
T P=Z(P,1)
 150 IF LEN C$>0 AND LEN C$<=5 THEN  IF C$="SOUTH
"( TO LEN C$) AND Z(P,2)=0 THEN  PRINT '"THERE'S
NO EXIT SOUTH!"
 160 IF LEN C$>0 AND LEN C$<=5 THEN  IF C$="SOUTH
"( TO LEN C$) AND Z(P,2)<>0 THEN  PRINT '"OK": LE
T P=Z(P,2)
 170 IF LEN C$>0 AND LEN C$<=4 THEN  IF C$="EAST"
( TO LEN C$) AND Z(P,3)=0 THEN  PRINT '"THERE'S N
O EXIT EAST!"
 180 IF LEN C$>0 AND LEN C$<=4 THEN  IF C$="EAST"
( TO LEN C$) AND Z(P,3)<>0 THEN  PRINT '"OK": LET
 P=Z(P,3)
 190 IF LEN C$>0 AND LEN C$<=4 THEN  IF C$="WEST"
( TO LEN C$) AND Z(P,4)=0 THEN  PRINT '"THERE'S N
O EXIT WEST!"
 200 IF LEN C$>0 AND LEN C$<=4 THEN  IF C$="WEST"
( TO LEN C$) AND Z(P,4)<>0 THEN  PRINT '"OK": LET
 P=Z(P,4)
 210 FOR A=1 TO 50: NEXT A: PAUSE 50
 220 GO TO 40
8000 PAPER RND*7: BORDER RND*7: INK 9: CLS
8010 GO TO 8000+(P*100): REM FIND ROOM DESCRIPTIO
N OF PRESENT ROOM
8100 PRINT "THE ENTRANCE HALL"
8110 PRINT
8120 PRINT "This is a small square room withan op
en door leading to the      South."
8130 RETURN
8200 PRINT "THE DINING ROOM"
8210 PRINT
8220 PRINT "There are three possible exits  from
this room. That's North,   East and South."
8230 RETURN
8300 PRINT "THE KITCHEN"
8310 PRINT
8320 PRINT "The Kitchen is quite a small    place
, but there are two exits  for you to leave by.
You can   either go North or East."
8330 RETURN
8400 PRINT "THE MAIN BEDROOM"
8410 PRINT
8420 PRINT "This is probably the biggest    room
in the whole house.  There are two exits, one in
the South wall and also one in the West."
8430 RETURN
8500 PRINT "THE CLOSET"
8510 PRINT
```

'VENTURING OUT...

When it comes to adventures, Dave Nicholls is certainly not green — so he takes a look at Emerald Isle and draws some conclusions about the Illustrator.

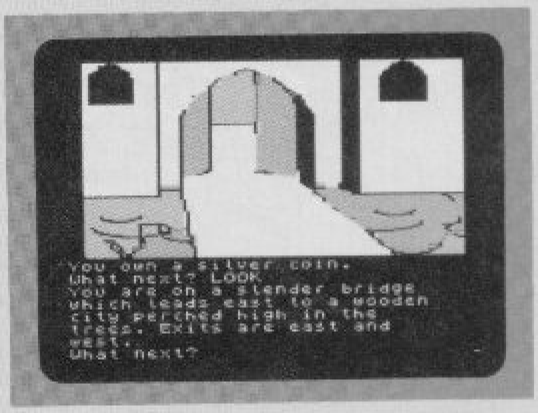
EMERALD ISLE
Level 9 £6.95

It's always been tricky to find fault with Level 9's adventures on technical grounds. They have had one major drawback though — the £9.95 price tag! Let's hope that *Emerald Isle* represents a change of heart — it retails for £6.95. The question is, of course, has the quality of the game suffered? Well, as far as I can see the answer's no; there are still over 200 locations and bags of atmosphere and puzzles.

You are the pilot of a light aircraft, forced to bail out while flying through the *Bermuda Triangle*. At the start you're to be found hanging by your parachute *(nasty Ed.)* from a tree on a strange island. Once you've come down to earth, you're faced with the harder task of finding a way off the island — and only the ruler of the land is allowed to leave. The good news though is that the throne is up for grabs — the bad news is that you have to prove yourself worthy!

Every location has long textual descriptions along with a picture filling the top half of the screen. It's a shame but the pictures don't really add a lot to the game and I tended to turn them off after a while to speed things up. The atmosphere is maintained by loads of different messages and you'll get a 'clever' response to most of your inputs. I wasn't too sure about the 'I nearly understand' message though — I'm sure it means nothing of the sort!

If you're a fan of Level 9, then all you need to know is that they've done it again. If you're new to adventuring or if you've always shied away from paying a tenner for a game, then *Emerald Isle* could be just the introduction you've been waiting for.



Level 9's *Emerald Isle* — a full-blown adventure for a budget price.

THE ILLUSTRATOR
Gilsoft £14.95

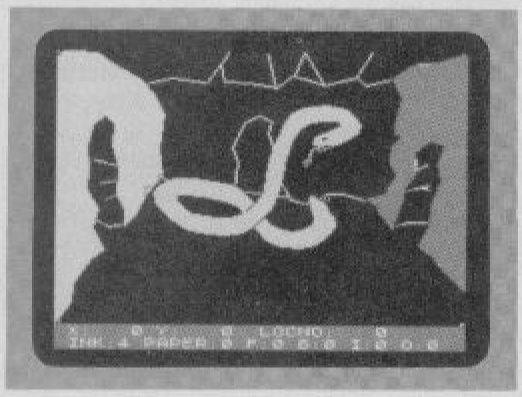
When Gilsoft first brought out *The Quill*, text-only adventures were the norm. Now they have come up with *The Illustrator* which allows you to add full screen graphics to Quilled adventures. You can then save the game independently of both *The Quill* and *The Illustrator.*

When the program's loaded, a largish menu appears listing the various options open to you; normally the first you'll choose is "LOAD DATABASE". This loads in the first few bytes of a previously created Quill database. Then *The Illustrator* finds out how many locations there are and how much space is available.

Now comes the creative bit. Once you've told the program about your game you can get on with the business of drawing pictures. Each piccy is stored not as a series of bytes like a Spectrum SCREEN$, but instead it's kept as a series of commands that recreate the original when you play it back. This saves one hell of a lot of space but it does mean that you've got to start with a pretty good idea of what the final picture will look like. And although editing facilities are provided, any mistake can mean going right back to square one.

There are commands for point plotting and line drawing as well as several fill routines and an excellent shading command that lets you produce a stipple effect. You can also define pictures as subroutines and use them over and over again. If I have a niggle it's the lack of circle and arc drawing commands though this can be got round.

All in all, *The Illustrator* is an excellent companion to *The Quill*. It'll produce some very good pictures, subject to artistic ability, of course — which I'm rather short of!



A pretty good likeness of the snake from the Hall of the Mountain King drawn on the Illustrator by someone with no artistic talent!

```
8520 PRINT "This is the smallest room in thehouse
, with an exit to the Northand also one to the We
st."
8530 RETURN
9000 REM SET UP Z() ARRAY
9010 DIM Z(5,4)
9020 FOR A=1 TO 5
9030 FOR B=1 TO 4
9040 READ Z(A,B)
9050 NEXT B
9060 NEXT A
9070 DATA 0,2,0,0
9080 DATA 1,3,4,0
9090 DATA 2,0,5,0
9100 DATA 0,5,0,2
9110 DATA 4,0,0,3
9120 LET P=1: REM START IN ROOM 1
9130 RETURN
```

The Hobbit it ain't, but at least this program will allow you to grasp the idea of command recognition and room layout.

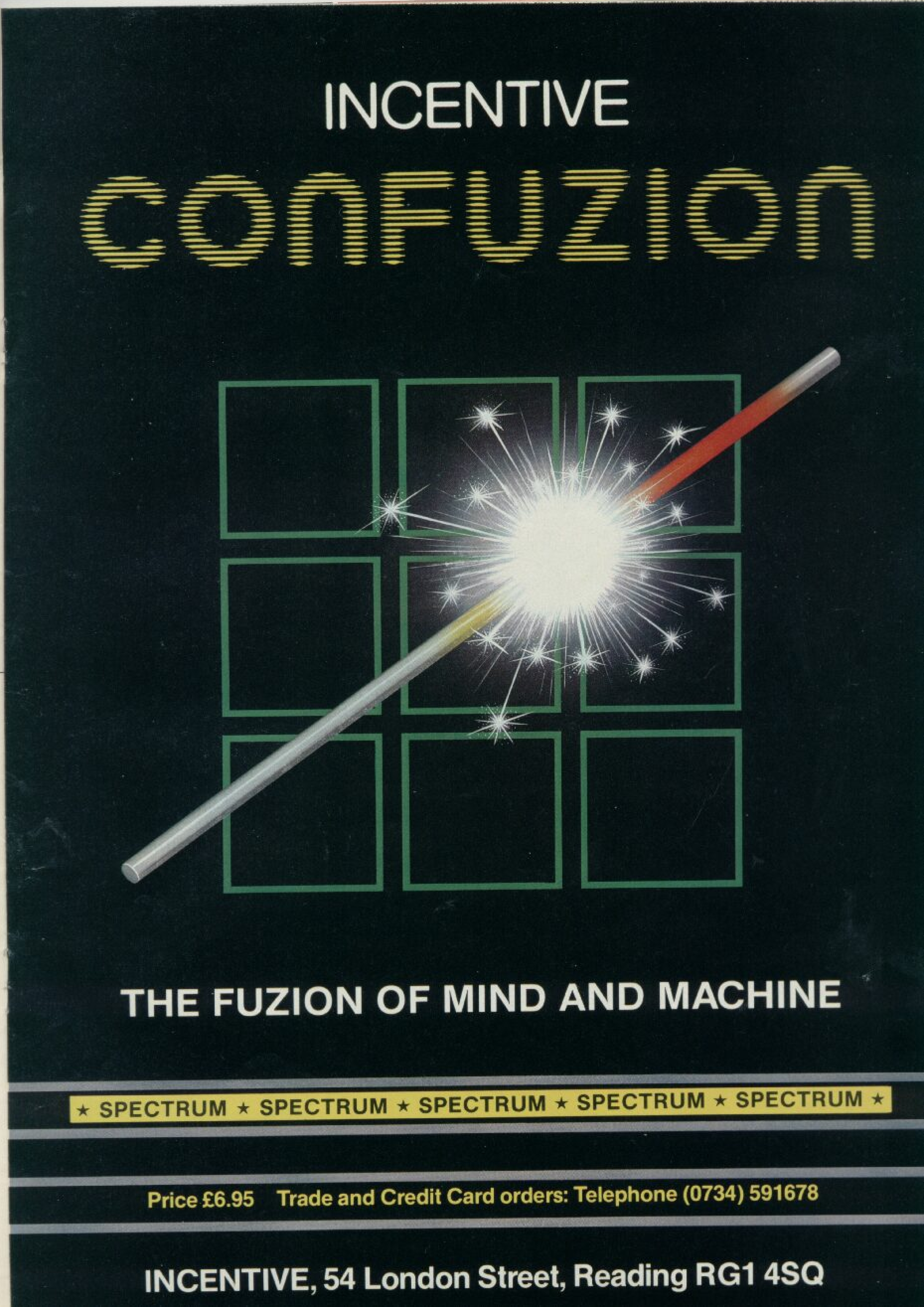
Brief Encounters

A quick mention for a couple of goodies that came our way this month. The first is *Confidential* from a new company called Radar Games. You play a character called Craig Adams who's out to solve the case of a missing person. This involves questioning suspects and following up clues. *Confidential* is written with *The Quill* and costs £6.95 from Radar Games, 53 Flavell Street, Woodsetten, Dudley, West Midlands.

The other game is *Talisman* from Games Workshop. It's not really an adventure, though, more an animated strategy game in which up to four players (either computer or human controlled) search for a legendary source of power that'll give them control of the land. The game's not at all bad but what struck me most was the intelligence of the computer controlled characters. A pretty brainy bunch — while I was playing a demo game with all four characters controlled by the machine, one of them solved the quest!

YS ADVENTURE HELPLINE

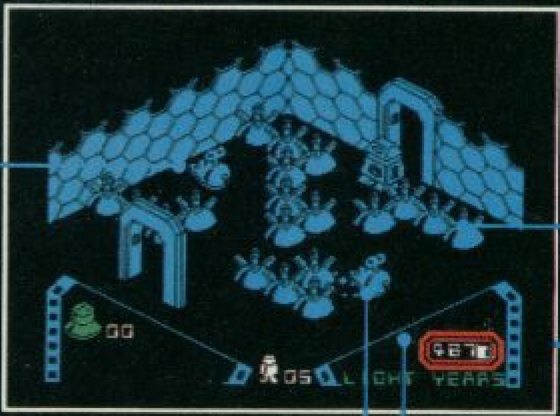
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Gary Smart (0264) 59489 and Peter Marment (0264) 66660.
Scotland:
Neil Mackintosh 041-332 2216.


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"Next time I'll remembr the bleep cheese"

They may look cute but don't be fooled, these clockwork rodents are out to wind you up.



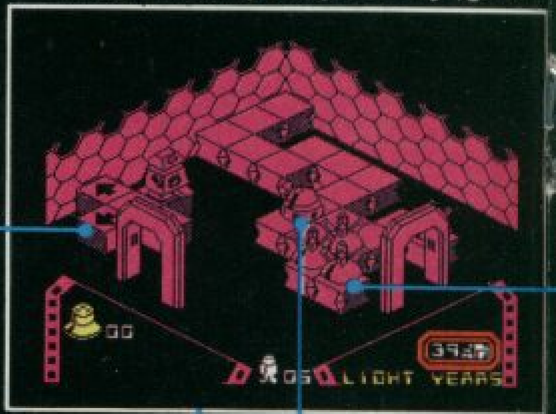
Danger, UXB. Just one touch and you'll be blown into oblivion.

Wait for the mice to clear a path for you, then leg it to the other side. But watch out for the mice — the fewer the mines, the faster they move.

Keep an eye on your light yearometer — even at sub-hyperwarp speeds it's later than you think.

"Lucky I know my bleep from my right!"

Jump on the arrows to control the direction of the robodroid — but you'll probably find it easier to jump on and off again rather than crossing the central square.



Here's where your robodroid begins its minesweeping manoeuvres. And if it strays from the path, you'll just have to leave the room and start again.

The robodroid spin
antennae flashing.
a pudding basin wi
be sunk without it.

"Top of the bleep world, ma.!"

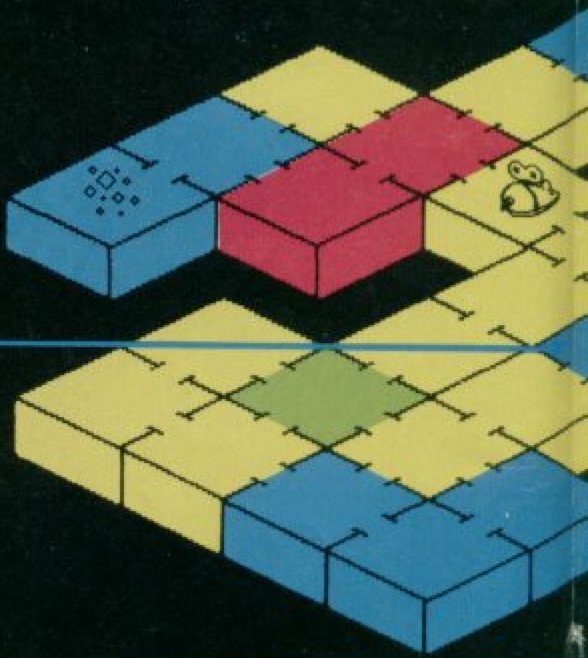
Going up — and down. But if you sit here you won't come to any harm. Robots don't get vertigo.



Another thermolec value to add to your collection. This one's just visible, but you'll have to hunt for some behind collapsing blocks.

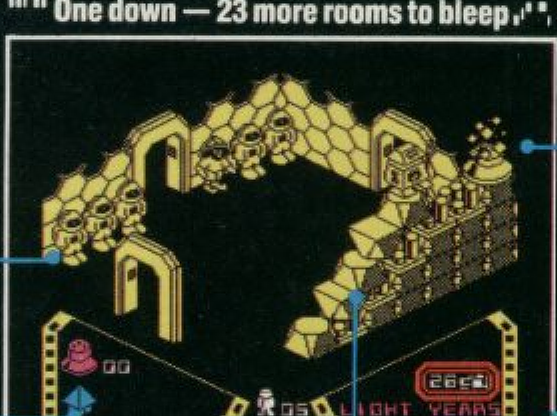
These two blocks are elevators like the one you're on, but they offer a one way ticket to destruction. Wait where you are till you reach the bottom then run like hell.

If you happen to nut one of the pyramids, you'll end up with a nasty case of concussion — and another life lost.



"One down — 23 more rooms to bleep"

This bunch of stiffs is the future master race. (*Some future — Ed.*) But only if you can activate all 24 rooms of them before your time runs out.



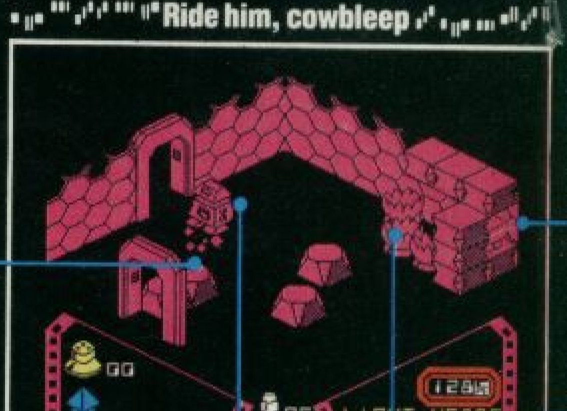
If the matching thermolec valve isn't here, you'll just have to go and find it. And remember that you can only carry four at one time.

The activation socket flashes on and off showing you which shape valve to plug in. Once it's in, the room goes white and, bingo, you're ready for the off again.

This pile of rubble started life as a column. But the only way you're going to reach the socket is to knock it down and start clambering.

"Ride him, cowbleep"

The travelling Toffos are your only hope of escape. Try and position them between you and the sparkler and then make a mad dash for freedom.



Bronco-bustin' an alien sparkler is a tricky business. It's either bucking you onto the boulders or trying to scramble you along with the egg-shells.

You won't get to wor
eggs. Even when the
hatched their shells
some damage.

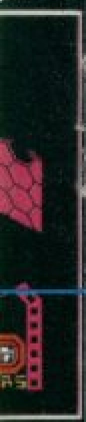
Yes, Alien 8 has arrived, the new megagame from Ultimate*, and shock, horror, it looks almost identical to the last megagame from* Ultimate*, Knightlore — the same number of rooms, the same 3D graphics, just substitute a dinky robot for Sabreman and the Werewulf. But first impressions aren't always best as* Ross Holman *and* Chris Wood *found out when they started playing . . .*

ALIEN AID

Help is at hand. You'll never get lost again if you follow our room-by-room guide to the Alien 8 spaceship.

- It's in one of these four rooms that your vital mission starts.
- These are the cryogenic chambers — easily recognised because the astronauts are here, but not so easily activated.
- You'll always find a thermolec valve in these rooms — but don't give up if you don't spot it straight off.
- You won't find any valves in these rooms, but take care, for the alien menace still lurks behind every door.
- The mutant daleks aren't that fast moving but they're still deadly if they creep up behind you.
- Learn to control the robodroids in these rooms — they're often your only hope of clearing the mines and getting out again.
- Watch out for the clockwork mice in these rooms — they're erratic and unpredictable, just like the real thing.
- Prepare to be pushed around in these rooms — the alien sparklers aren't lethal but they just won't take no for an answer.

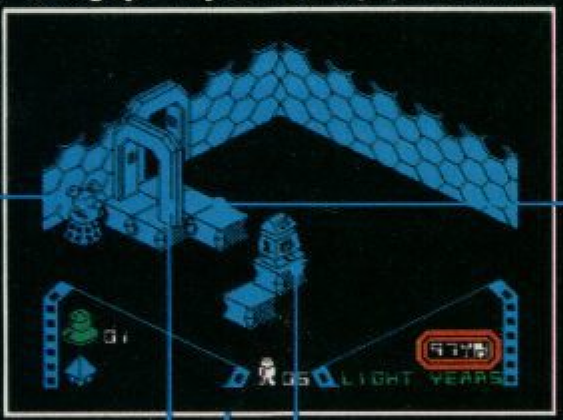
ht!'" "



The mines blocking your exit may be a minor problem for the robodroid — but they mean major surgery for you. So, watch out if you come rushing in from this door.

odroid spins into action, he flashing. OK, so it looks like ng basin with ears but you'd without it.

"' Going up — my CPU's in my speech unit "'

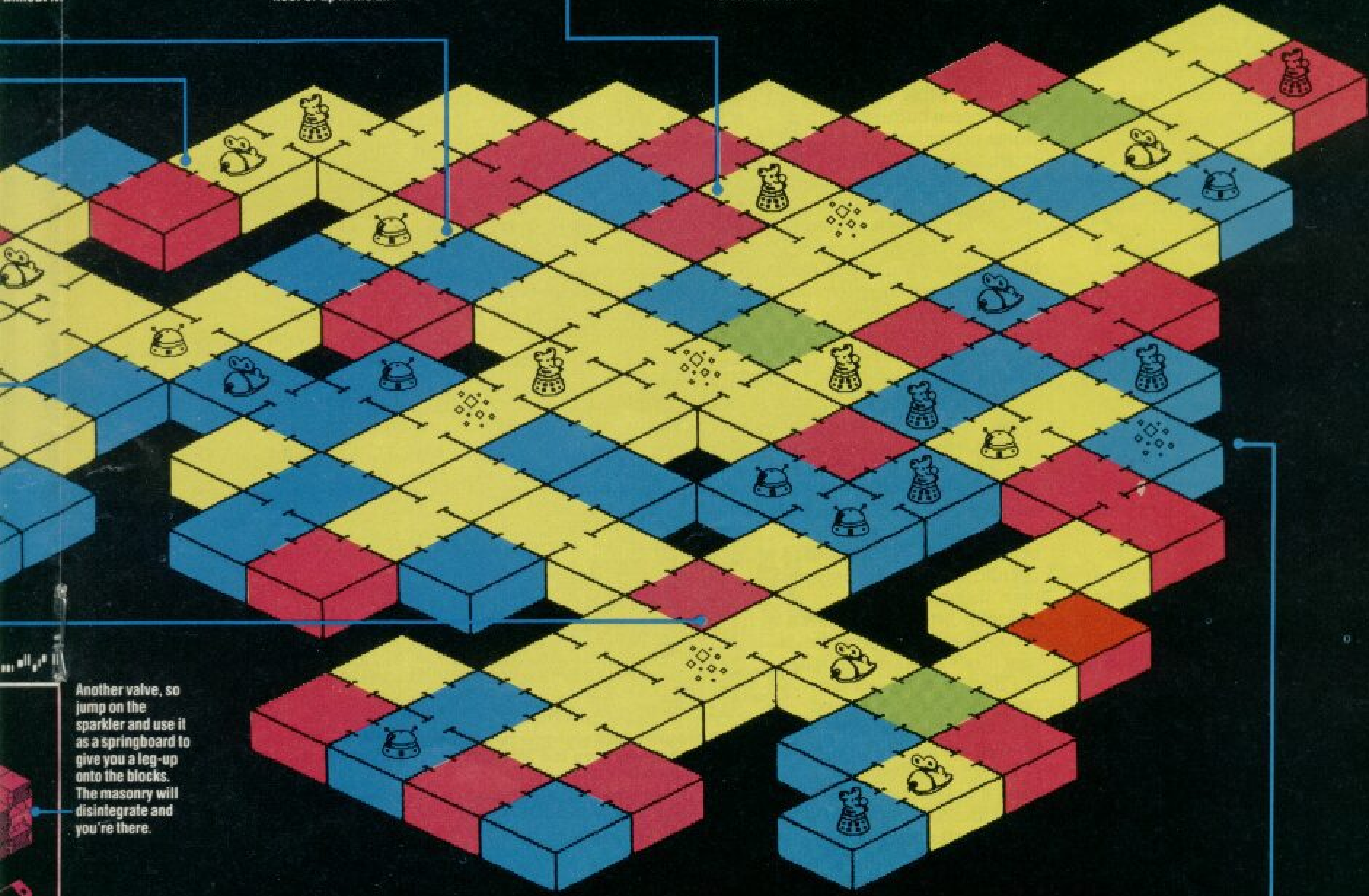


What do you get when you cross a dalek with Mickey Mouse? Whatever it is, it'll probably look very like this.

Prepare for another elevating experience. Entice the dalek off his perch, hop on and you've got lift off.

C'mon level with me — the pespective makes it tricky in some rooms to tell if the doors are on the floor or up in the air.

It's lucky your cybot's made of heavy metal — you'll need all his head-banging skill to move this block and release the dalek.



Another valve, so jump on the sparkler and use it as a springboard to give you a leg-up onto the blocks. The masonry will disintegrate and you're there.

n't get to work on one of these ven when the aliens have d their shells can still do you amage.

MAP CONSTRUCTED BY MARTIN DIXON

A SPACE ODDITY...

So now we know. The reason nobody can hear you scream in space is . . . they're all frozen stiff. Or rather they are 'cryogenically immersed', for *Alien 8* comes with the same sort of instructions as Ultimate's other recent games. Enigmatic is an understatement. Obscure, opaque, mysterious or just plain unintelligable would be closer. Certainly, lots of long words and not many facts to join them together.

Much easier to pick up the gist of the plot by playing. All you need to know is that you are a robot, sorry, cybot, programmed to look after all the needs of the frozen astronauts, off on a jolly jaunt to colonise distant worlds. Unfortunately, the ship has been invaded by aliens and the life support systems have been damaged. You now have to reactivate these systems before the astronauts turn into real stiffs.

Reactivation is achieved by collecting 'thermolec valves' (different shaped objects) and plugging them into the cryogenic sockets (holes to plug in different shaped objects). With 24 chambers to be reactivated and only 5 initial replacement packs (lives), it's not a task that'll be completed first time out. You're going to have to get used to the screams of a lot of defrosting spacemen as they re-enter the atmosphere. Luckily, on the Speccy nobody'll hear them.

Any resemblance to any other Ultimate program is purely uncoincidental. And sure, you're going to think you've been conned by a clone when you first load it up. But once you're into the game you'll see that it's much more complex than its predecessor and perfects all the techniques that *Knightlore* prepared us for.

So, now check out our map and start planning your movements with the microwave on legs. YS

HACKER'S GUIDE

***We have lift off . . . Dave Nicholls and Chris Wood blast their way into the hackers' hyperspace of Ultimate's* Alien 8.**

"How do I become a hacker?" That's a question more and more of you are writing in to us at *YS* to ask. To put it bluntly, a lot of you are trying to run before you can walk. If you really want to become a red-hot hacker then you've got to be prepared to put in some graft. The best way to gain the necessary experience is to get out there and start writing machine code programs of your own. Only then will you start to get the feel for the hacking game.

Learning to hack is a bit like learning to read — first you learn the Z80 instruction set (your alphabet) and then you'll begin to recognise the groups of instructions which make up common subroutines (words). Soon you'll surprise yourself with the speed you've started to hack at. Instead of giving up in despair, you'll be recognising whole chunks of code at a glance.

However, you'll always come across games which don't seem to fit in with all you've picked up previously. 3D games are the biggest headache in this direction and what's *Alien 8*? — why, a 3D game, of course. The standard way of tackling 3D graphics requires a lot of maths and a lot of late nights but at least you'll be able to hack into it. *Alien 8*, like a lot of arcade games, doesn't use the bog-standard method, of course, because that would be just too slow. At first glance, the toughest part of the whole process is overwriting. This means that once a room is set up, the programmer can start filling it from the 'back' so that the objects which appear nearer to you 'overwrite' everything behind them. The maximum number of distinct objects in a room is an incredible 56 and it only takes one slip-up to ruin the whole optical illusion.

Ultimate write everything initially to a buffer high up in memory and then the final stage is to copy the whole lot into screen RAM where you can see it. Most games which use a screen buffer (*JSW* is a prime example) use the LDIR instruction to copy to the screen. Of course, Ultimate have got to be different — they copy line by line from the bottom up! But it's not bloody-mindedness, just that they write their programs on a machine with an identity crisis — it only thinks it's a Spectrum (*delusions of grandeur, eh? — Ed.*).

Ultimate's code is slick and professional but it bores me. *Alien 8* is no exception. This time I managed to catch them out though — in one part of the program there's a jump made to the very next instruction. It's a bad habit to get into, as it wastes space and time, though it makes assembly listings much more readable for us hackers. So, as space isn't a problem in *Alien 8*, I'll let them off just this once but it'll be a hundred lines each if I catch them doing it again!

For all that, I've got to hand it to Ultimate. *Alien 8* was a tough one to crack. Since our last hack into one of their games, they've made a few improvements to the speedloader they use — it's even acquired a name, Speedlock. At any rate, it's been a couple of times round the track since it was used for *Decathlon*.

After that, it seemed a doddle writing an infinite lives program. So easy in fact that I added the facility for infinite time. Now the clock wraps right round when it gets to zero. It's a bit of an anti-climax when you run out of time anyway — we were expecting, if not a big bang, then a bit of a whimper as the space ship enters the atmosphere and your unfortunate astronauts frazzle. No such luck.

The second program is a bit specialised but I rather like it and thought you might too. Type it in and alter the lines that are indicated and you'll have a program that saves any screen at any stage of the game to tape, just by pressing Pause and then the S key. Think of the fun you can have — save a series of screens onto tape, dump them onto your printer and turn them into your very own *Alien 8* cartoon. Send them in so we can all have a look. Software prizes for the funniest!

At Troubleshootin' Pete's insistence, I've made things a bit easier this time as some of you had a few problems with *Underwurlde* and *Ghostbusters* and he couldn't help — he's totally useless (*so what's new? Ed.*) when it comes to helping with hacking problems. It's now a one stage operation. After typing in the program and running it you should get a 'STOP statement' message. If you get 'ERROR in DATA', go back and check your data. If all's well, you can now take out line 25 and save the program — next time you use it you can just run it. Then enter 'GOTO 30' and put your fully rewound *Alien 8* tape into the cassette recorder and press play. The game will now load and give you infinite lives and time. Don't worry that the name *'Alien 8'* doesn't appear on the screen, it's just that the program ignores the header on the tape. If the second part of the tape fails to load straight after the first part, you'll have to rewind and start again. If there are any errors the program keeps trying to reload rather than stopping with an error message.

```
 10 LET tot=0: FOR n=50000 TO 50089: READ a: LET
 tot=tot+a: POKE n,a: NEXT n
 20 IF tot<>10530 THEN  PRINT "ERROR IN DATA": S
TOP
 25 STOP
 30 PRINT AT 10,10;"INSERT TAPE": RANDOMIZE USR
50000
 100 DATA 62,255,55,17,141,5,221,33,203,92,20,8,2
1,243,62,15,211,254,205,98,5,48,233,33,86,176,34,
233,96,33,157,195,17,28,238,1,200,0,237,176,243,2
37,94,33,41,236,229,33,137,97,229,51,51,17,41,236
,1,242,1,33,253,94,253,33,239,96,221,33,184,98,62
,200,237,79,195,137,97,62,0,50,24,202,62,201,50,1
72,173
 110 DATA 195,0,99
```

This program will give you infinite robot replacement packs and though it won't stop the clock, it'll give you all the time in the (other) world.

```
 10 LET tot=0: FOR n=50000 TO 50185: READ a: LET
 tot=tot+a: POKE n,a: NEXT n
 20 IF tot<>22467 THEN  PRINT "ERROR IN DATA": S
TOP
 25 STOP
 110 DATA 17,60,240,33,66,238,1,150,0,237,176,33,
60,240,34,60,206,62,240,50,3,99,50,148,166,195,0,
99,205,89,183,245,211,253,62,253,219,254,203,79,3
2,35,245,197,213,229,221,229,17,17,0,221,33,114,2
40,175,205,198,4,221,33,0,64,17,0,27,62,255,205,1
98,4,221,225,225,209,193,241,175,211,254,241,201,
3,65,76,73,69,78,32,56,32,170,32,0,27,0,64,0,128
```

Our optional addition to the program will let you save screens from the game to tape just by pressing Pause and then the S key. Get dumping!



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IT'S A CRACKER!

The true hacker enjoys the battle of wits with the protective programmer. **Terry Bulfib** *tips the scales your way.*

Now I've said it before in the previous Codebuster articles but it's worth repeating just in case there's anyone who still doesn't believe that software piracy is illegal or wrong. It is, on both counts and neither I nor *Your Spectrum* will ever condone it. It harms the magazine, it harms the software companies but, worst of all, it harms you and me, the people who buy software.

So, if you've got any ideas that this article will aid you in your attempt to make a killing at tape copying, you'd be better off reading Computing for Petty Criminals or similar unworthy rags. I'm writing only for the dedicated hacker who is excited by the challenge of breaking into programs 'because they're there'. Nuff said.

TAKING CONTROL

Generally the only way to get into a protected program is to nobble it before it runs! Once the code gets control, the programmer will have fixed things so that you can never seize the reins again. The dedicated hacker gets around this inconvenient fact by using a customised ROM incorporating his own BREAK routines. But clever and/or unusually paranoid Protection Artists have taken to adding routines to check that the standard Spectrum ROM is still there before allowing the program to continue!

Some programs do this during the LOADing, and then use up several Kbytes in pure misdirection before getting to a bit of code that unscrambles the encrypted program and then erases itself, disappearing up its own tailpipe. Others apparently check for the presence of the ROM constantly during play, and it immediately crashes when the customised ROM is paged in.

CRASH BARRIERS

How do they check that the ROM is there? Obviously they can't check the whole ROM, byte for byte, without LOADing a copy of it, a pure waste of 16K. They can check the whole thing by adding up all the bytes modula 256, which means throwing away any part of the sum which overflowed one byte. You would then have only one chance in 256 of your custom ROM adding up to the same byte. However, this actually takes some time, so it can hardly be used within the action.

Usually only a few key bytes can be checked, so which are chosen? Obvious candidates are the various bits of the initialisation code, starting at address 0. This address it often used as a 'crash and burn' jump for destroying anything that the program thinks might have been feloniously LOADed by a hacker. This is the address that all the crash on BREAK protection tapes rely on to wipe the memory when you fiddle, and so a customised ROM might be expected to disable this initialisation routine, as we suggested in our last article.

NON-MASKED BALL

Another candidate is the non-maskable interrupt routine at 66H. This has been wasted in the Spectrum. It almost provides a redirectable reset to the address stored in the two 'spare' locations in the system variables at 23728, but for a 'jump not zero' instruction being used instead of a 'jump if zero'. In my custom ROM, I have rewritten this non-maskable interrupt to jump to my own de-trap and BREAK routine.

The non-maskable interrupt is activated by its own line (NMI) on the expansion bus being grounded momentarily, and the 'non-maskable' means that it can't be disabled by the 'disable interrupt' instruction. This makes it an obvious choice for the hacker's custom ROM rewrite, and therefore a target for the Protection Artist's search and destroy routine.

Checking for hacker's rewrites is made easier by the fact that there is not a lot of code in the ROM that can be displaced by one's own routines without causing trouble with programs that use the ROM for printing, etc. If you have a large custom ROM, or rather EPROM, or even RAM, then you can use the area from 386EH to 3CFFH for your own code, as the Spectrum doesn't use it. However, if you have only a small custom ROM (mine is just a 1K 2708 EPROM programmer board designed originally for use with an Ohio superboard and now heavily messed about), then you can make use of the memory in the 'token table' from 95H to 1FDH. Your BASIC keywords will not be recognisable if you rewrite this section, but everything else



GRAHAME BAKER

will work. Unless the Protection Artist checks up on this area, that is.

CUSTOM BOARDS

Ideally, a custom ROM or RAM board will be set up so you can easily switch it in or out of the memory map. Indeed, with RAM this is a necessity, or you would never be able to start the Spectrum up in the mornings. With 1K of RAM located in the lowest 1K of the address space, the sequence goes something like this: Turn on the Spectrum with the RAM paged out, SAVE the Speccy ROM to tape (SAVE "rom" CODE 0,1025), type in LOAD""CODE then play the tape, as soon as the header has LOADed switch in the RAM. This has to be after the header, or the printing of the header name, which uses a jump at address 10h, will cause a crash. You then have a copy of the ROM on board in rewriteable RAM. This will only work with a 1K custom RAM, as the tape routines start at about the beginning of the second K, and they would disappear when the RAM was switched in. Larger custom boards will require a small M/C routine.

One thing to watch out for when using RAM in the ROM area is that the Spectrum BASIC actually corrupts the first few bytes of the RAM at addresses 0 to 5. This seems to happen every time you drop out of a program with STOP or an error message or even when you enter a command for immediate execution. Ordinarily, this won't matter, because this part of the ROM is only used at power-up, but since the Protection Artist is likely to check here, it makes using a ROM-in-RAM type of custom ROM rather more difficult. Why the Speccy ROM tries to write over itself is a mystery to me. If and when I find the bit that's doing it, I expect to be appalled at the sloppiness, but as I haven't found it, I had better control the ribald disparagement for now.

Some programs load not just the whole of the RAM, but also load over the ROM, so if you don't page out your ROM-in-RAM customisation while LOADing, it will be converted back to the standard ROM contents!

If the custom ROM (or rewritten RAM) can be switched in at *exactly* the same time that the NMI is activated, then no amount of checking up by the Protection Artist will keep you out. With computer speeds, 'exactly' means that you will have to use a bit of silicon to do the switching, rather than just a double pole mechanical switch, but if you have already built yourself a piece of moveable memory map then the extra few gates won't give you any problem.

EASY ENTRY

Not everyone, I realise, has the skill, time, or even the cash for building the kind of hacking hardware we're talking about here. Don't be downhearted, though, as it still is — and always will be — possible to hack into the headers of Speccy progs, whatever the Protection Artist hurls at you. Hardware just makes it easier, or at least it used to before the PAs started in on that too.

However, it is occasionally possible to catch the PA out in an uncharacteristic lapse. It is when he is feeling most secure that he is likely, while assembling his armour, to absentmindedly drop the codpiece behind the sofa. The fastloader has brought out the laziness in some of the breed, and they forget all they have learned at their computer's knee.

There is a very simple trick which I have kept under my hat until now because once everyone knows about it, steps will be taken against it in all future programs. Luckily for you, I can contain myself no longer. This is one that anyone can use, sans hardware, sans money, sans mental effort.

First the lazy Protection Artist thoroughly disables the BREAK key, and finds that this also takes care of any 'STOP in INPUT' type of BREAK. He may then decide to use a Basic routine for INPUT instead of writing his own when he wants you to input a name, especially if SAVing or LOADing a partly completed adventure, say, on tape. Certainly the usual Basic BREAKs like Capshift 6 or entering 'STOP' will be useless. He will have checked for those before he got lazy.

The trick is to erase the quotation marks with the cursor keys and DELETE, and then type CHR$ USR 4867 and ENTER (using the keywords). This is accepted by the Basic as a string which it must find by converting a CODE into a character, and the CODE is to be found by calling the machine code routine at 4867 decimal. Naturally, calling this machine code address results in a BREAK, because 4867 decimal is our old buddy 1303 hex!

If the crash-on BREAK traps were set, then this would cause a crash, but the DF SZ trap cannot be used, because the INPUT command uses the lower screen, and the ERR SP trap is simply by-passed by the USR call directly to the end-of-program routine at 1303H. I know of at least two recent top selling programs that this wheeze *does* work on, neither of which is an adventure, as it happens.

Any program that gives you a flashing cursor flanked by quotation marks will fall for this, so get digging in that pile of old tapes, 'cause you will not find it on any new ones from now on. That's the problem with blabbermouths like me.

LABEL	ASSEMBLER		COMMENT
SHIFT	DI		;Mustn't have interrupt with no ROM.
	LD	HL,0	;Move ROM contents to high
	LD	DE,08000H	;memory.
	LD	BC,04000H	
	LDIR		
LOOP	LD	A,07FH	;Wait until SPACE is pressed to
	IN	A,FE	;give time to switch in the RAM.
	RRCA		
	JRC	LOOP	
BACK	LD	HL,08000H	;Move contents back to the RAM
	LD	BC,04000H	;now in the ROM's slot.
	LDIR		
	EI		;Otherwise locked out.
	RET		

This is the machine code routine if you are using a custom board larger than 1K.

CODE CURES

If you followed all the Codebuster articles you're probably a pretty proficient hacker by now. Or perhaps you reckon you were one anyway. Well, now's your chance to put your skill to the test.

That's right we're setting you some hacking homework. Terry has written a cracker of a program designed to test all the techniques which you've picked up in his articles.

So, heads down and get cracking — it's the only way you're ever going to make it to a fully fledged Codebuster.

Follow the instructions exactly as listed below.

1 Type the program in *exactly* as shown. Don't even mess about with the line numbers.

2. SAVE it with GOTO 9999 to have an unprotected copy to use again. This is especially important in case you've made an error when typing it in.

3 RUN it to produce the protected CODE LOAD, after which it NEWs itself. Make sure you've followed the instructions in 2 above or you'll have to type it all in again.

4 Do LOAD""CODE to load the protected program.

```
  10 CLEAR 50000
  20 FOR i=50001 TO 50024
  40 READ a: POKE i,a: NEXT i
  50 DATA 237,123,178,92,59,33,8
1,195,229,237,115,61,92,175,50,6
8,92,33,110,0,251,195,158,27
  60 POKE 65358,63: POKE 65359,5
  70 POKE 65360,81: POKE 65361,1
95
  80 LET a$="PROTECTED": GO SUB
200
  90 SAVE "protected"CODE 16384,
49152
 100 RANDOMIZE USR 0
 110 INPUT "NAME? ";a$
 120 GO SUB 200
 130 GO TO 110
 200 CLS
 210 FOR i=1 TO 704/(LEN a$+1)
 220 PRINT a$;" ";
 230 NEXT i: RETURN
9999 SAVE "demobasic"
```

OK, busters, can you crack it? There are at least three ways to crack this one and all have been revealed in Codebusters. One is a snap, one is a chore, and one is so-so. Maybe you'll be the one to find us a fourth, but remember — nobody loves a clever dick, so there are no prizes *(and no, it's not 'cos we're too mean — Ed)*. But think of the satisfaction you'll get from knowing that you've done a bit of breaking and entering and got away with it.

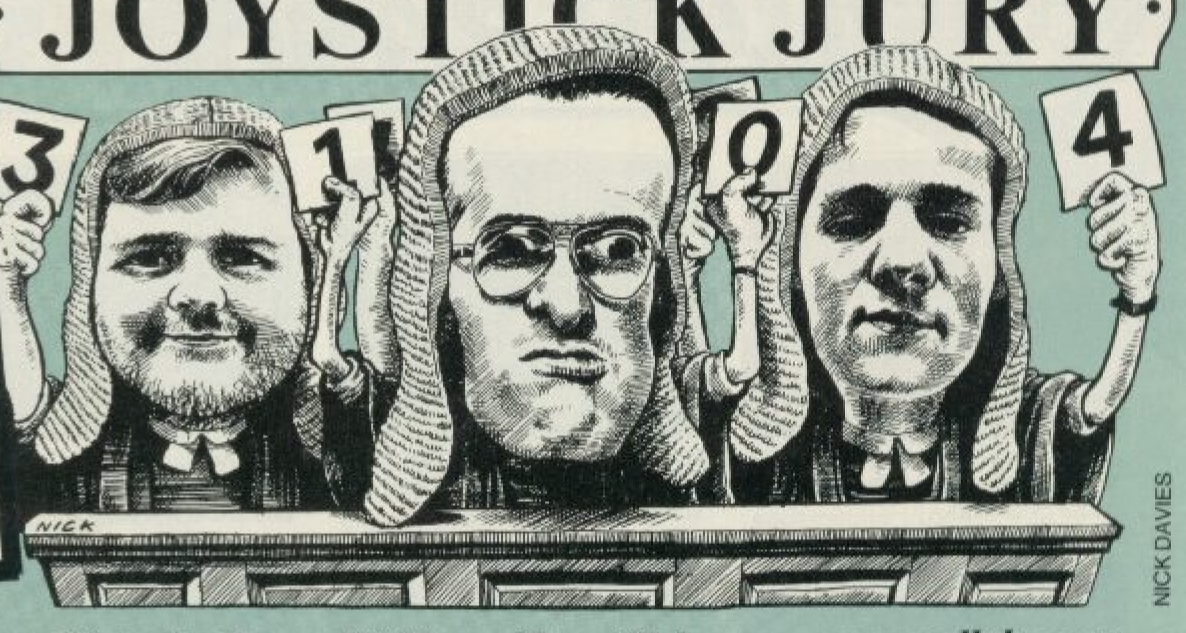
So hackers, drop us a line with all your clever tales of how you managed to take us to the cleaners. Get bustin'.

JOYSTICK JURY

YS

Back on the bench again, our joystick jurors are here to pass judgement on all the latest software. Read their sentences before you commit your cash.

WARNING!
Just in case you find our scoring system too confusing, here's what it's all about. The score out of five at the end of each person's review is based on their experience of the game. But that's pretty subjective . . . so they also use the HIT and MISS system to indicate its potential as a commercial success.



NICK DAVIES

Up before the beaks* — Dave Nicholls, Roger Willis *and* Ross Holman — *comes all the new games software, from the greatest to the grottiest.



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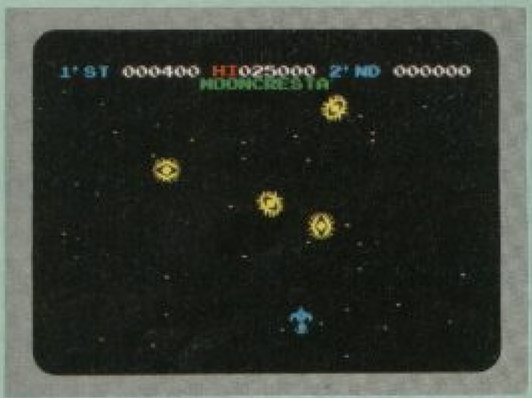
Dave: Have you ever had the urge to fly aerobatics with the Red Arrows? You have? — then rush out and buy *Psychedelia.* It's not a flight simulator but the feeling of nausea that came over me while waggling the joystick with it, was like nothing on earth! What's more, *Psychedelia* isn't a game: it's really a sort of light synthesiser where you use the joystick (or keyboard) to produce patterns on screen. It offers the facility for presenting patterns so you can play them back with a single keypress, and your efforts can be recorded into memory or onto tape for later playback. Think of it — now you and your friends can bring on an attack of nausea and dizzyness at parties without so much as a drop of pop passing your lips.

It may be true that you are limited only by your imagination (or so it says here), but boredom (and an unwell feeling) set in long before I'd even got my imagination into gear.

It's worth a look — otherwise a ride on a Waltzer at the fun fair is cheaper and has much the same effect. *1/5* **MISS**

Ross: Not the sort of thing you expect from Jeff blast-it-if-it-moves Minter. I prefer watching pictures, not patterns erupting from my T.V. screen. *2/5* **MISS**

Roger: Turn on, tune in and drop out or, in my case, drop off to sleep. When old hippies aren't bogarting that joint, they're producing crap like this. *2/5* **MISS**



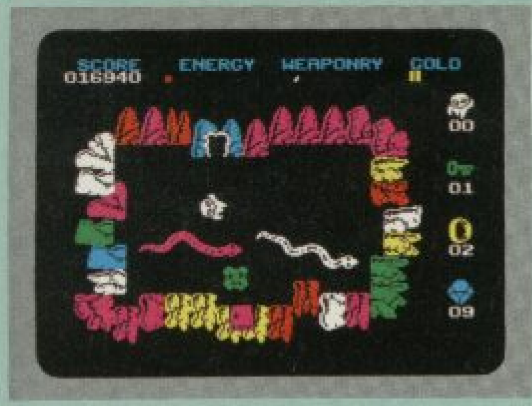
MOONCRESTA
Incentive Software/£6.95

Dave: *Mooncresta* is an officially licenced copy of the same name arcade game, and as you'd expect, it includes all the main features of the original. If you've never seen it (*which pubs did you misspend your youth in? — Ed*), the basic idea is just for a change, to zap aliens. There are four types and each of them appears for two screens in succession. Your ship is made up of three parts, the first of which is given to you gratis, but you've got to earn the rest. You get the next part by clearing four sheets, after which you have to carry out a successful docking manoeuvre. Two more sheets — watch out for the nasty surprise — then a repeat performance of the docking procedure. If, or should I say, *when* you get killed you'll lose one part of your ship.

Incentive has done a reasonable job translating *Mooncresta* to the Spectrum but it's a bit long in the tooth now. So, unless you're an arcade freak who likes scoring millions it won't have much lasting appeal. Still, if you *are* an arcade freak, you'll be itching to have a crack at Incentive's *Mooncresta* competition — the booty is a real arcade machine of the game. $2\frac{1}{2}/5$ **HIT**

Ross: It's taken aeons for this old arcade classic to appear on the home computer market. It plays fairly close to the original and kept me amused for an hour or two, or three. *3/5* **HIT**

Roger: It advertises a 'Trip To The Space War' but give me a trip to Margate than yet another trip back down memory lane. *2/5* **MISS**



WIZARDS LAIR
Bubblebus/£6.95

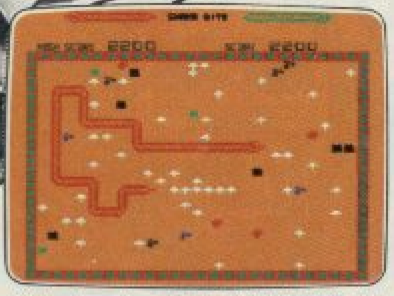
Roger: Having finally overcome Pothole Pete's frustrating reluctance to LOAD, let alone summon up the necessary bottle for tackling many rooms of the wicked Wiz's extensive and well-appointed Lair, I was somewhat less than enthralled by this Bubblebus offering. Apart from being as bored with a predictable ragbag of Sword'n'Sorcery imagery, I found the graphics rather lurid, the rooms unmemorable and the action mentally untaxing.

Pete's quest involves hunting pieces of the 'Golden Lion' — which I always thought was a public house but apparently in this game it ain't. Shame. Along the way he must collect the necessary mystic Weetabix to sustain his battle against nasties and keep the jolly old doors opening when required. Energy, ammunition and objects in stock are recorded on-screen, as are remaining lives. Probably the most entertaining facet of *Wizard's Lair* is guessing how many other mediocre games it reminds you of. Pass me the dungeon key, mum, 'cos I want to go home... *1/5* **MISS**

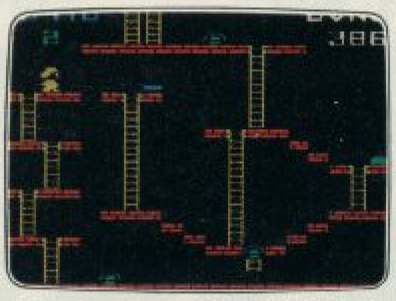
Dave: If this had come out at the same time as *Atic Atac,* Ultimate would've looked very silly. Now the idea's rather old hat and even the superior graphics don't make up for that $2\frac{1}{2}/5$ **HIT**

Ross: Take a dash of *Atic Atac* ideas, mix in more than a smattering of *Sabre Wulf* graphics and what've you got? — not a lot. *2/5* **HIT**

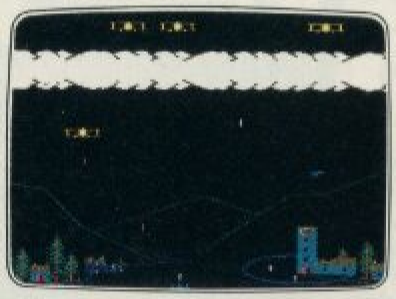
SILVER RANGE Seeing



001 Arcade VIC 20 (UNEXPANDED)
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002 Arcade, VIC 20 (UNEXPANDED)
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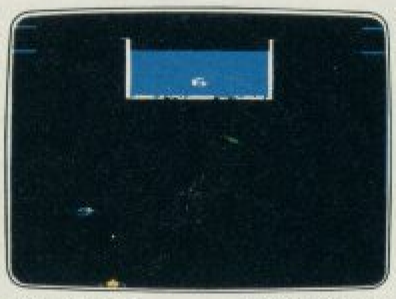
003 Arcade BBC MICRO B
BIRD STRIKE – Wing the planes and shoot the pigeons.



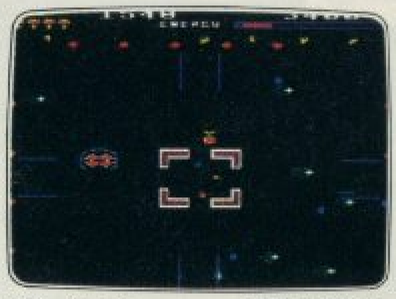
004 Arcade BBC MICRO B
GOLD DIGGER – The hazards of digging for gold down under.



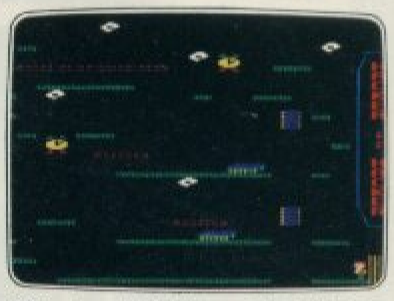
005 Arcade BBC MICRO B
DUCK! – Comedy and music in this duck shoot.



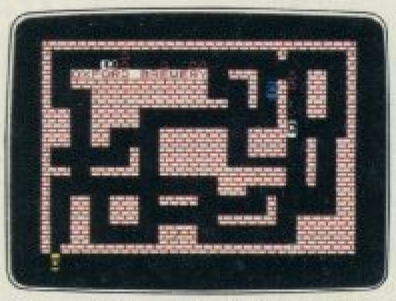
013 Arcade BBC MICRO B
ACID DROPS – Fly through to tackle the mutant spinners.



022 Arcade BBC MICRO B
ESTRA – Recover the sacred statue of Estra the snake god.



023 Arcade/Strategy BBC MICRO B
THE HACKER – Terminal to modem, telephone network to mainframe.



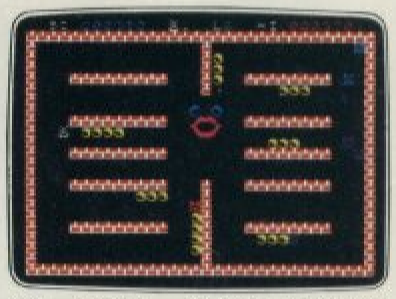
006 Arcade SPECTRUM 16K/48K
RUN BABY RUN – Multi-car cop chase and shoot-out.



009 Arcade SPECTRUM 16K/48K
TERRA FORCE – Terra man defends earth against all odds.



010 Arcade SPECTRUM 16K/48K
MENACE – What happens when teacher turns his back.



021 Arcade SPECTRUM 16K/48K
CRAZY CAVERNS – Ten crazy caverns, ten hungry mouths to feed.



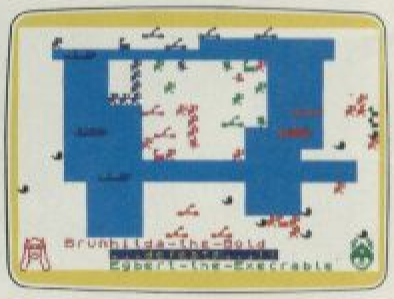
007 Arcade SPECTRUM 48K
EXODUS – Strange creatures emerging from the pits.



014 Arcade/Strategy SPECTRUM 48K
MR. FREEZE – Six compartments, each tougher to de-ice.



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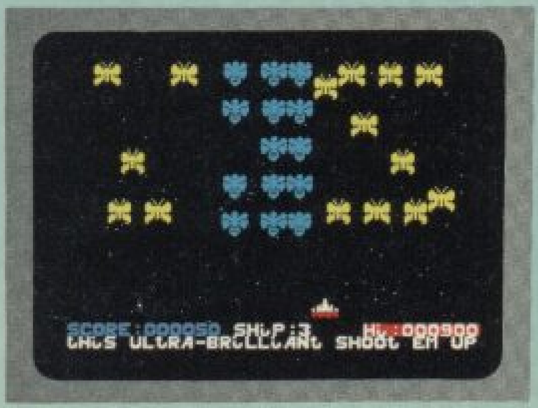
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JOYSTICK JURY



HALAGA

Interceptor Software/£5.50

Ross: The Federation of Space Research has just found a new solar system called Cygnus Major and they want it explored for mineral resources.

When you arrive you find that the space invaders don't like having their space invaded and are hell bent on your destruction. The only way for you to swot the insect-like creatures is to use your anti-matter plasma gun.

This game is in fact very loosely based on the arcade favourite Galaga and is a 2nd generation Galaxians. This version does not have all the features of the original but is never-the-less a reasonable shoot'em up and will keep your trigger finger in good shape. The aliens swoop onto screen, do a few twirls and pirouettes, dropping bombs as they go, then fall into formation. This continues until the screen is fairly full up with them, at which point they begin to drive down on individual kamikaze style bomb runs. Once you have cleared the skies the inevitable happens. Yes, they all come back but are just that bit meaner.

Nothing new again but O.K . . . *3/5* **MISS**

Roger: There are no flies on me but the same cannot be said for this dose of futuristic insecticide... *1/5* **MISS**

Dave: The shoot'em up is alive and kicking. Fast, frantic, colourful and noisy — just the thing for an evening of mindless slaughter. *1/5* **HIT**



RAID OVER MOSCOW

U.S. Gold/£9.95

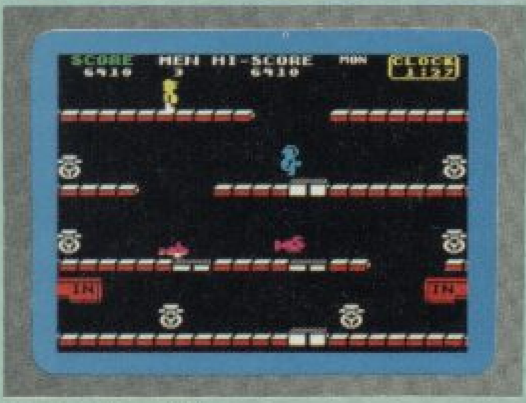
Dave: A pre-emptive strike has been launched by the Ruskies and your duty is to lead your airborne commandos to destroy the Soviet defence centre.

First off, you'll get a view of Russia and the US as seen from space showing lauch sites and targets in the two countries. The time to impact of the launched missile ticks away, so you've no time to lose. The number of fighters you can manoeuvre out of the hanger determines how many you have in the ground attack sequence. Here you fly from left to right negotiating pill boxes, trees, towers and avoiding tanks, helicopters and deadly heat seeking missiles whilst wreaking as much destruction and havoc as poss.

When you reach the launch silos your target computer helps you to line up and destroy them. Once that's done you're free (well, this is a democracy!) to attack Moscow itself. Then it's on again to annihilate the robots protecting the nuclear reactor. If you can kill enough of them you'll live to fight another day in the battle between Marx and MacDonalds. If not, then it's Mutually Assured Destruction time. *4/5* **HIT**

Roger: Get *your* finger on the button with sicko software that extracts technically excellent entertainment from nuclear nightmares! *5/5* **HIT**

Ross: Praise for its originality and cleverness has to be tempered with moral abuse but it is, nevertheless, a direct hit with no survivors. . . *5/5* **HIT**



TOY BIZARRE

Activision/£7.99

Roger: Lightning fast arcade action occurs as you feebly attempt to keep up Merton the Maintenance Man's work rate in this simplistic game of platform pretension. Our Mert's night shift is supposed to be in a toy factory where valves blow up balloons which, in their turn, convert into terminal toys if not avoided and/or dealt with. Just to complicate matters a little, an unpleasant character called Hefty Hilda wanders about, turning back on the valves Merton has turned off and thoroughly nobbling the poor devil in the event of, er, body contact. Piston platforms can also deliver unpleasant surprises to both hero and villainess. The single screen 'wraps round' so exiting our hero from one side. Within its relatively limited content, *Toy Bizarre* hangs on as reasonable entertainment value for those with quick reactions but it's difficult to avoid thinking that this is one format that has almost been caned to death. *2/5* **HIT**

Dave: This game is in need of some maintenance — the controls are sluggish and the collision detection leaves a lot to be desired. Unfortunately, Merton the Maintenance Man isn't up to the task. *2/5* **MISS**

Ross: This is a fairly simple platform game with nice graphics and some novel ideas, but not much else. I liked the balloons but was bored by the rest. *2/5* **MISS**



WRIGGLER

Romantic Robot £5.95

Ross: *Romantic Robot*'s not a name I'd come across before, so I was very pleasantly surprised by this game. You're a contestant in the Annual Maggot Marathon, so all you have to do is wriggle your way to the finish.

The area of play covers 256 screens and features a whole geography of distinctly different landscapes, each with its own problems. You start the race with three competitors but they soon head off in different directions. You have the choice of following them or making your own way. The paths you follow are bordered by multi-coloured foliage — similar species to those growing in *Sabre Wulf*. All the time you're racing, your energy decreases, so you must either eat or become just another pile of bones in the lonely wastes. Food, in the form of ice creams or cups of tea can be picked up and eaten whenever you're on your last legs (*legs? maggots? Oh, well! Ed*).

Two varieties of ants and spiders lurk within the leaves — the first are relatively harmless, but watch out for the others, they're deadly.

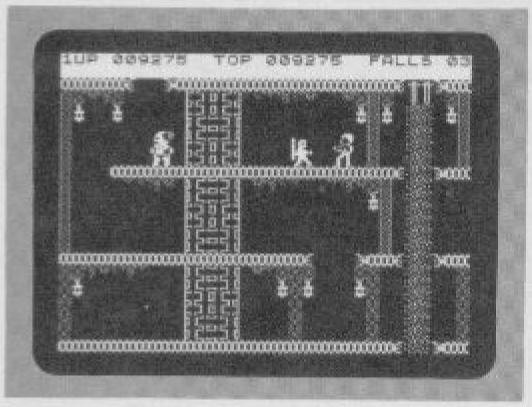
The graphics are very good if a little sparse but they do become repetitive and the game plays on the slow side. All in all, a respectable runner-up rather than a winner. *3/5* **MISS**

Dave: A very original game with fun graphics, but it's a touch slow to play. There's a large area to explore but illogical layout makes mapping difficult. *3½/5* **HIT**

Roger: I'd like to say this was rotten to the core but you won't worm it out of me . . . **MISS**



JOYSTICK JURY



BRUCE LEE
U.S. Gold/£7.95

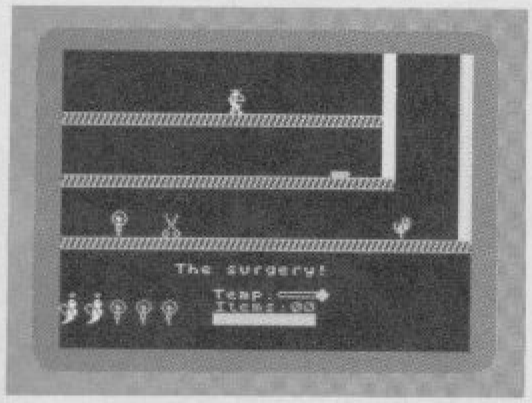
Dave: Clever these Chinese — coming up with an original idea for a platform game that doesn't involve mines and has more to it than just leaping about from ladder to level. Actually, it's not Chinese at all, but it is about Bruce Lee, so that's close enough. You play Bruce, out to destroy the Evil Wizard and gain immortality and infinite wealth.

You have to face up to all the hazards of going into another man's castle, like landmines and electric bolts, before coming face to face with little Ninjas (*who he? Ed*) and a distinctly off colour Green Yamo, laying into you with fists and feet flying. You can return the compliment, as well as ducking down to avoid trouble. In each room you'll find a number of lanterns: collect enough of them and a passageway will open allowing you to creep up on the Evil Wiz. But you've got to Kung Fu your way through 20 rooms before meeting him head on.

The problem is, it's just too easy — I'm no black belt but I beat the game on only my fifth attempt. There is an option to play against an opponent which will keep competitive cowards happy but in the end you'll probably long for a bit of real physical contact. *3½/5* **HIT**

Ross: This can't compete with the typical Chinese take-away — it left me with an empty feeling but not wanting more. *2/5* **HIT**

Roger: Grasshopper say, knee in groin better than poke in pocket by this oriental offering. More chop-suey than Kung Fu. *2/5* **MISS**



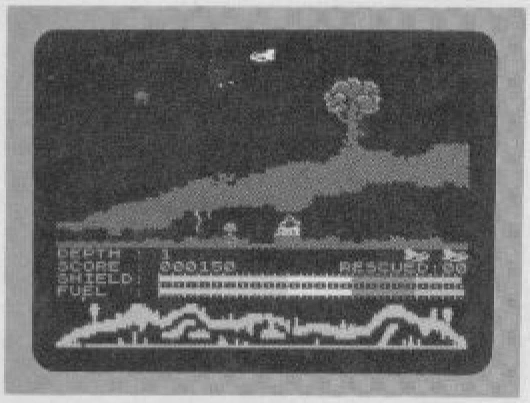
STAY KOOL
Bug Byte Software/£6.95

Roger: This curious melange of mystic, prehistoric and scatological imagery, varying from a pterodactyl's lair, vampire lemons and the occasional sewage processing installation is really just one more competent multi-screen platform game. Trotting from room to room and jumping are both accurately controlled. There's a well-defined geography and a huge assortment of life-depriving nasties. As usual, the purpose is, to collect objects and accrue an even higher position on the 'Hall Of Scum' chart.

It's entertaining to play, I suppose, but stunningly short on originality. You can almost imagine some programmer discovering a mixed bag of graphical left-overs discarded in his machine memory and deciding that it would be a pity to waste them. If lack of some consistent theme doesn't bother you very much, then by all means attempt to avoid that final plunge into the cess pit. *2/5* **HIT**

Dave: They just keep on coming, wave after wave of them, the *Manic Miner* clones. This should-have-been-a-budget-game from Bug-Byte was one of the first to bite the dust. *2/5* **MISS**

Ross: Bug Byte are still trying to come up with another Mathew Smith type success but this Jet Set clone just isn't the answer. This won't even compete with *Technician Ted. 1½/5* **MISS**



SUBTERRANEAN STRYKER
Insight/£6.95

Dave: When I first started playing this game I got that feeling that I'd been here before. On reflection, I decided that though the game as a whole is new, it's blagged a lot of ideas from other games.

Your aim is to destroy the enemy's Power Crystal which is situated on the fifth level of an underground complex.

Off you go, steering your ship through all the levels, avoiding the nasties and rounding up slave workers. Once you've collected all the workers, you gain entry to the next level.

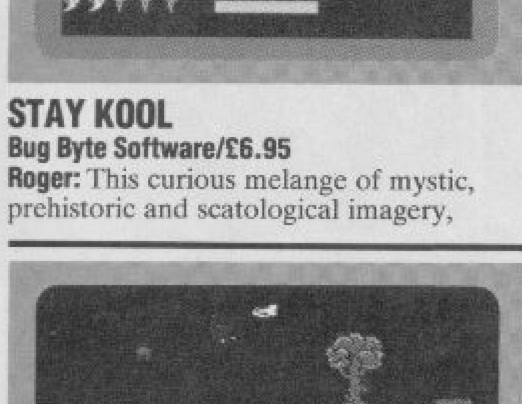
The complex itself is made up of smoothly scrolling caverns — you can see where you are on the screen display as well as other status information about shields and the like. Each level is about eight screens wide and you'll find in them a fair old selection of fully animated flying and earthbound hazards. I can't see that the game's got much to offer the arcade player but the graphics are O.K.

Perhaps it's worth a look for the rest of us mortals. *2½/5* **MISS**

Ross: This combined shoot 'em up and maze game has some nicely animated graphics. Shame the flickery scrolling spoils the effect. *3/5* **HIT**

Roger: The name hints at this being Arthur Scargill's favourite Spectrum game.

If only the enemy Power Crystal wasn't in the hands of Auntie Maggie! *4/5* **HIT**



SAM STOAT
Gremlin Graphics/£6.95

Ross: *Sam Stoat,* Gremlin Graphics' latest anti-hero is an evil little burglar. His beady eye is trained on four houses in a very select area and he's intent on purloining the jewels concealed within. The four houses are graded in difficulty and you can choose which one to start Sam off in. There are twenty rooms per house (see what I mean about a select area), one of which contains a safe, and each safe contains a diamond.

To get his mits on the diamond, Sam must blow up the safe with a bomb which he finds in each house. Then it's a case of light the blue touch paper and retire rapidly. With the diamond and any other jewellery in his swag-bag, he can move on to case the next joint. At the bottom of the screen is an unusual timer (a bloodometer) which the aenemic Sam has to keep topped up by tippling at a bottle of *Sam Stoat* elixir. That's his excuse!

Sam's not alone on his blagging jaunt but has to contend with a variety of other creatures, most of them gnomes. Probably got bored with sitting round the pond with a fishing rod. The game's very colourful but the breaking and entering is needed to get the adrenalin running. *2/5* **MISS**

Dave: What a rip off. The sleeve says there are four houses but they're just the same room with different meanies, so it really amounts to four skill levels. *1/5* **HIT**

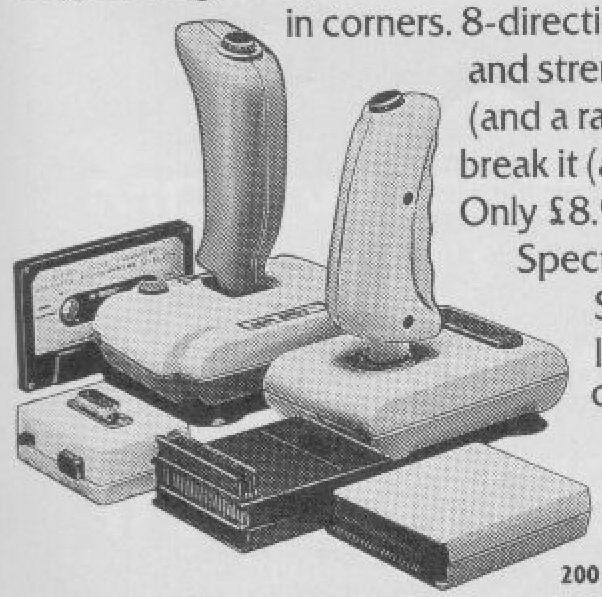
Roger: Respectable, upstanding members of the community would, no doubt, disapprove of this glamorisation of light-fingeredness. Spectrum tea leafs will love it. *3/5* **MISS**



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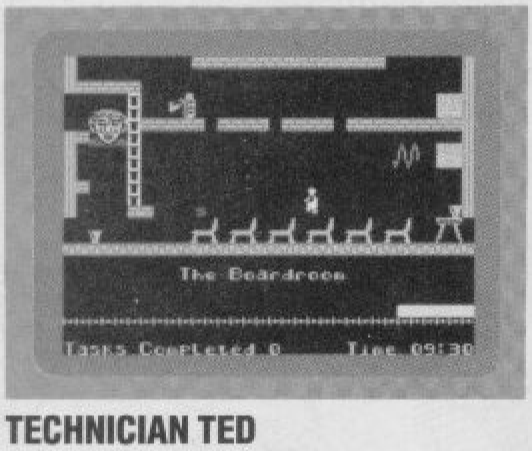


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JOYSTICK JURY



TECHNICIAN TED
Hewson Consultants/£5.95

Roger: Well even Willy has had to leave the Jet Set, apparently, changing nomenclature and seeking humble employment, just like the rest of us.

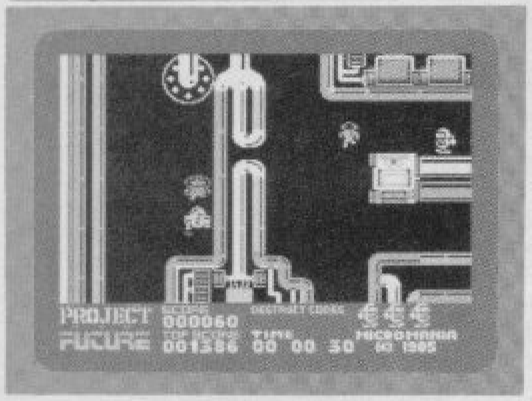
The Job Centre has fixed him up with a technician's slot in this chip factory, but the broad and erratic selection of munchkin equipment doesn't give much of a clue about whether we're talking silicon or spuds — whichever it is we're still talking the same old game...

Being hamstrung with such a blatantly derivative and unoriginal nature isn't going to do a great deal for *Technician Ted's* popularity but, having said that, it is still a well-crafted slice of software.

The programmer's claims that: "graphics are ultra-smooth and collision detection is exact" are actually truer than the average sales blurb's pork pies and the result is an extremely difficult platform job that demands practice and concentration. It is, nevertheless, best described as a triumph of technique over new ideas. *3/5* **HIT**

Dave: Some day all games will have graphics that animate this smoothly. This makes it one of the best platform games I've ever seen. *4½/5* **HIT**

Ross: Willy by any other name ... yes, it's another Jet Set copy! I'd like to know who still buys them all. If it's you, then you could do worse than this. *3/5* **HIT**



PROJECT FUTURE
Micromania/£6.95

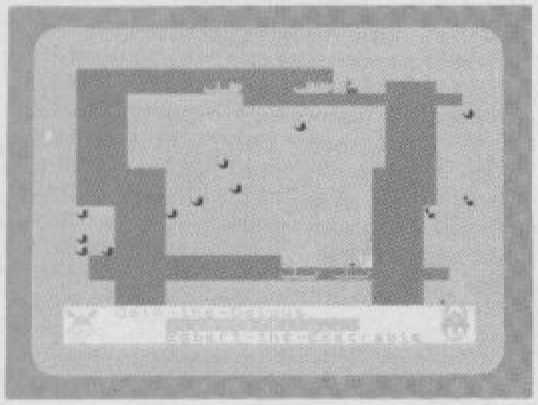
Ross: This latest offering from Micromania is a classic arcade adventure that we're now so familiar with on the Spectrum. It's set on the SS Future, a large space ship composed of 256 rooms and spread over 5 decks. You're entrusted with the task of destroying this vessel but *why* is never satisfactorily explained. Still, I'm sure there's a jolly good reason for it, even if it's only for a bit of interstellar vandalism. To bring off the big bank, you have to collect the eight destruct codes which are scattered all over the ship and take them to the destruct activation control.

Just to make sure things don't all go your way, the SS Future is protected by a selection of nasties that materialise out of the floor and home straight in on you. Luckily, you can blast them back to their constituent atoms with your laser. You'll also find scattered around the ship energisers that make you unstoppable for a few seconds.

I can't say that this is the most original idea for a game but it's done well and it does have very colourful graphics. It is, however, the first game to feature a jet powered C5 which can be used to glide around the ship — it's the only way to travel! *4/5* **HIT**

Roger: Beam me up, Speccy, and plug in the joystick. It looks like the *Self Destruct System* is gonna get me before liver cirrhosis sets in... *3/5* **HIT**

Dave: Why didn't they sub-title this '*Sabre Wulf* in Space'? Still, if you like running around in mazes and collecting things, then you won't be disappointed. *2/5* **HIT**



VIKING RAIDERS
Firebird/£2.50

Roger: This knockabout Nordic wargame features up to four armies slapping each other around a map showing angular fjords and the various battle formations. Swordplay, siege catapults and searfaring sorties are only a part of the potential conflict.

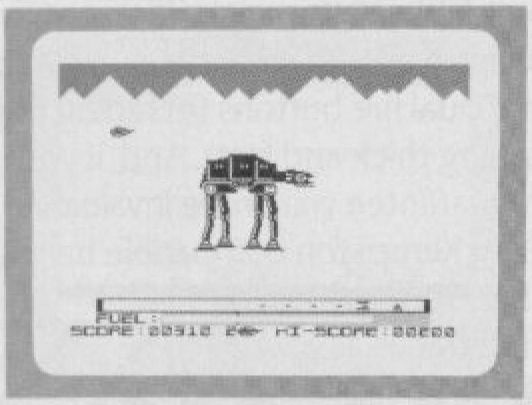
The hordes of Wotan The Wicked, Odin The Odious, Brunhilda The Bold and Egbert The Execrable, swarm across the northern tundra to battle it out under human control or computer substitution. But it's nothing to go berserk about!

To enjoy such uncivilised and aggressive behaviour demands a special penchant for this type of action, because the graphics are seriously underwhelming. The kick must be on a cerebral strategy scale but, if it is, I failed to find the fun and my concentration swiftly withered into plug-pulling boredom. If it's supposed to be about Scandinavian rape, pillage and loot tendencies, I think I'll stick to the crispbread... *1/5* **MISS**

Dave: I've always found something lacking in Speccy strategy games.

For the price though *Viking Raiders* is pretty good value if you're a strategist. *2½/5* **MISS**

Ross: This war game is slow and basic (in both senses). Still, I like the bit when your army stumbles on some booze and gets rapidly drunk. I know how they feel. *1/5* **MISS**



ATTACK OF THE EMPIRE
Chibur/£4.50

Roger: An extraterrestial Barbara Woodhouse would not be amused by attempts to destroy the Irish half-dozen of 'At-At Walkers' going walkies across this game's continuously scrolling screen, and neither am I.

Really, putting the poor pets to sleep with allegedly lethal laser cannon may be pathetically easy but I'm sure a gentle wallop across the nose with a rolled-up newspaper would suffice.

At least the 'Walkers' only drop 'Smart Bombs' and growl out 'Laser Bolts' in reply, which is better than leaving a mess on the pavement for a chap to step in...

What can I say? This dreadful load of sub-Starwars shootiebangs demands an attention span of just a little under ten minutes. That's how long it takes to get good at it, get tired of it and start wondering why anybody should want to buy it. You can pass the interludes between woofers by collecting 'rebel soldiers' from the planet surface but I really can't imagine why anyone would want to bother. *0/5* **MISS**

Dave: Ask your grandad about this one. It's so old and 'orrible you keep playing to see if it gets any worse. 1/5 **MISS**

Ross: Right back to the Dark Ages with this one — it's an old Atari VCS game and it shows.

The mechanical elephants are well drawn but hardly flicker-free. Pretty boring stuff. *1/5* **MISS**


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... nothing gained. But solve the mystery hidden deep within the walls of Castle Rathbone and you could carry off £250 cash or one of 100 Adventure Planners, all courtesy of Print 'n' Plotter Products.

Many have entered Castle Rathbone with a light heart and carefree step. No one leaves it the same way. The fact is that no one has ever got out. Held prisoner by the ruthless robber baron who rules over the fortress, the poor serfs (*that's us! Ed*) slave and toil without hope of freedom. Together we have pieced together a program which would show us the way out if only we could solve it. Take pity on our plight and do yourself a bit of good at the same time.

The Adventure Begins ...

Type in the program listed below making sure that you keep the numbers exactly the same as printed. Then save the program before running it. You are now ready to embark on your quest but make sure that you keep a careful map of the castle as you go. Otherwise you could end your days here with the rest of us unfortunates.

One of the rooms in Castle Rathbone contains a hidden message known only to the baron. You'll only discover his secret when you have visited all the other rooms which means that you could travel through the room many times before you find what you're looking for.

As soon as you have solved the mystery, send us the secret message and a copy of your map. Perhaps then, we poor denizens of this twilight world will be able to throw off our shackles and emerge into the day. After all, you've nothing to lose but your brains!

The Plunder

Print 'n' Plotter Products has come up with the amazingly mega offer of 250 smackers for the first person with the message and the map, to be drawn out of the newly freed Editor's hat.

The next 100 runners-up will all receive an Adventure Planner from P 'n' P. With one of these A3 planning pads, the days of solving adventures surrounded by scraps of paper covered in illegible scribble are over. You won't know how you ever managed before!

Send all your entry coupons with your maps attached to Print 'n' Plotter Compo, *Your Spectrum*, 14 Rathbone Place, London W1P 1DE.

P 'n' P Rules OK!

Entries for the Print 'n' Plotter Competition must be post-dated no later than May 31st 1985. Each entry form must have the secret message marked on it and a map attached. We don't expect an Ordnance Survey effort just so long as all the rooms are clearly laid out.

The Editor's decision is final and no correspondence will be entered into regarding this decision.

COMPETITION

```
  10 REM THE MYSTERY OF CASTLE RATHBONE
  20 GO SUB 9000
  30 LET P=1: LET CH=0: LET L=8: POKE 23658,8
  40 FOR A=1 TO 150: NEXT A: CLS
  50 GO SUB 8000: IF C(P)=0 THEN  LET CH=CH+1: LET C(P)=1
  55 IF P=L AND CH=23 THEN  GO SUB 8010
  60 INPUT "THIS COMPO WAITS FOR NO MAN...  WHICH WAY?", LIN
E A$
  70 FOR A=1 TO LEN A$: IF (A$(A)<"0" OR A$(A)>"9") AND (A$(
A)<"A" OR A$(A)>"Z") THEN  LET A$(A)=" "
  80 NEXT A
  90 FOR A=1 TO LEN A$: IF A$(A)=" " THEN  LET C$=A$( TO A-1
): LET A$=A$(A+(1 AND (A+1)<=LEN A$) TO ): GO TO 110
 100 NEXT A: LET C$=A$
 110 IF LEN C$>0 THEN  IF C$="NORTH"( TO LEN C$) AND Z(P,1)=
0 THEN  PRINT "THERE IS NO EXIT NORTH, CHUM!": GO TO 190
 120 IF LEN C$>0 THEN  IF C$="NORTH"( TO LEN C$) AND Z(P,1)<
>0 THEN  PRINT "OK": LET P=Z(P,1): GO TO 190
 130 IF LEN C$>0 THEN  IF C$="SOUTH"( TO LEN C$) AND Z(P,2)=
0 THEN  PRINT "THERE IS NO EXIT SOUTH, MATE!": GO TO 190
 140 IF LEN C$>0 THEN  IF C$="SOUTH"( TO LEN C$) AND Z(P,2)<
>0 THEN  PRINT "OK": LET P=Z(P,2): GO TO 190
 150 IF LEN C$>0 THEN  IF C$="EAST"( TO LEN C$) AND Z(P,3)=0
 THEN  PRINT "THERE'S NOTHING TO THE EAST!": GO TO 190
 160 IF LEN C$>0 THEN  IF C$="EAST"( TO LEN C$) AND Z(P,3)<>
0 THEN  PRINT "OK": LET P=Z(P,3): GO TO 190
 170 IF LEN C$>0 THEN  IF C$="WEST"( TO LEN C$) AND Z(P,4)=0
 THEN  PRINT "THERE'S NO EXIT WEST": GO TO 190
 180 IF LEN C$>0 THEN  IF C$="WEST"( TO LEN C$) AND Z(P,4)<>
0 THEN  PRINT "OK": LET P=Z(P,4)
 190 GO TO 40
7010 PRINT "You are now entering Castle     Rathbone."''"ABA
NDON HOPE ALL YE WHO ENTER   HERE ...": RETURN
7030 PRINT "CONFUSED BY THE MAZE OF HALLS...": RETURN
7040 PRINT "Pete's Pit - The home of the    unclean"''"You'd
 better leave fast or he'llstart asking you stupid        q
uestions!": RETURN
7120 PRINT "LOST IN CASTLE RATHBONE...": RETURN
7130 PRINT "This is the Ed's State Office..."''"... And what
 a state it is too": RETURN
7180 PRINT "CAPTURED BY THE CASTLE...": RETURN
7190 PRINT "You're in The Throne Room"''"Great Shanks design
er decor...": RETURN
7230 PRINT "YOU ARE SHROUDED BY THE MIST...": RETURN
8000 GO TO 7000+(P*10)
8010 PRINT '': RESTORE 8000
8015 READ B: IF B<>999 THEN  PRINT CHR$ (B/2);: GO TO 8015
8016 STOP
8020 DATA 174,138,152,152,64,136,158,156,138,66,26,26,174,13
0,168,134,144,64,158,170,168,64,140,158,164,64,160,78,220,78
,160,78,230,64,130,136,172,138,156,168,170,164,138,64,166,15
8,152,170,168,146,158,156,166,66
8030 DATA 999
9000 RESTORE 9000: DIM C(23): DIM Z(23,4)
9010 FOR A=1 TO 23: FOR B=1 TO 4
9020 READ Z(A,B): NEXT B: NEXT A
9030 DATA 0,2,0,0,1,3,0,0,2,0,5,0
9040 DATA 0,0,6,0,0,0,9,3,0,0,11,4
9050 DATA 0,8,0,0,7,9,0,0,8,10,0.5
9060 DATA 9,11,0,0,10,0,12,6,0,0,16,11
9070 DATA 0,14,17,0,13,15,0,0,14,0,18,0
9080 DATA 0,0,19,12,0,0,20,13,0,0,21,15
9090 DATA 0,0,23,16,0,0,0,17,0,22,0,18
9100 DATA 21,23,0,0,22,0,0,19
9110 RETURN
```



Print 'n' Plotter Competition

I found it! I was wandering around in Castle Rathbone and the secret message flashed before me as I entered one of the rooms.

The Message reads ....

Name ....

Address ....

....

.... **Postcode** ....

Don't forget to attach your map or we'll never escape in time to pick your entry out of the hat!

Send this completed coupon off to Print 'n' Plotter Compo, *Your Spectrum*, 14 Rathbone Place, London W1P 1DE.

MAGAZINE HEALTH WARNING

Can you be cruel enough to sever your copy of *YS* from its coupon — use a photocopy instead!

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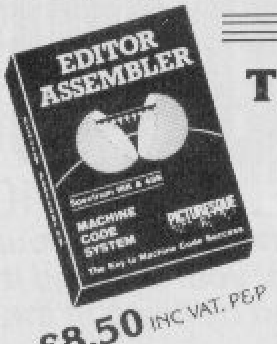
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C combines high-level structuring with direct control over the machine, all at compiled speed. Our compiler is now available from good retailers, and has proved extremely popular. It supports all statement types (plus inline code) and over 40 operators; whilst char, int, unsigned and combinations using pointers, arrays, structures, unions, functions, and typedef are all allowed data types. External and static variables can have initializers, whilst auto variables support recursion. There are six preprocessor directives and over 60 library functions with a selective inclusion scheme.

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MON QL is our latest product and our first on the QL; it was written by Andy Pennell, who has a great deal of experience on the QL. It is similar in style to the well-known MON 'front panel' in DEVPAC and includes additions like job control and multi-tasking support. It also catches system exceptions and includes fixes for QDOS.

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All prices are for cassette versions (except CP/M and QL) and include VAT and p&p in the UK. Please contact us for export orders, disc formats or detailed technical information packs. All products are available by mail order: please send a cheque or Postal Order. Sorry, we do not accept credit cards.

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■ I have lots of software to swop, including *Logo*, Hisoft *'C'* and many latest games and utilities. Would like a Microdrive Interface 1 or W.H.Y. Tel. 01-274 9231 and ask for Barry.

■ Willing to swop *Valhalla, Chess, Chequered Flag,* and *Jasper* for *Kosmic Kanga, Pyjamarama, Star Strike, Skool Daze, Cyclone,* or *Alien 8*. Your list for mine. Write to Keith Lowdon, 2 Lydgate View, Wolsingham, B. Auckland, Co. Durham.

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■ Swop *White Lightning, HURG* and *Melbourne Draw* for Fuller keyboard, or ZX Printer and Currah Microspeech. Lots of software also. Send your list for mine. Tel. (0532) 609938 (after 6 pm) and ask for Ron.

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■ Swop *Make-a-chip*, Computer *Scrabble, Survival, Chess, Chequered Flag* and *Horace Goes Skiing* for other software eg, *Flight Simulation*. Write to Leza Haystead, 22 Cawstons Meadow, Poringland, Norwich, Norfolk.

■ Swop games including *Fighter Pilot, Zig Zag, Trashman, Deathchase, Scuba Dive* and *Zzoom*. Tel. (0923) 24705 and ask for Mr S Powell.

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■ Large number of Spectrum books at less than half price. Also books on Forth. Tel. (07605) 402 and ask for A Pearson.

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■ Swop 53 games for Microdrive and Interface I. Titles include, *Boulder Dash, Buggy Blast, Blue Max, Star Strike, Pyjamarama*. Tel. (0602) 267946 and ask for Stephen.

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■ *Match Day, Airwolf, Technician Ted, Buggy Blast, Knight Lore, Backpacker's Guide* and many more to swop. Send sae and your list for mine to T Mayers, 10 Damside Street, Lancaster, Lancs. LA1 1PB.

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»HARDWARE

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■ RTTY for 48K Spectrum, G3LIV TV unit, Scarab interface and program, leads and instructions, swop for Interface I and Microdrive. Write to M L Bland, The Cabin, Sea Lane, Huttoft. Alford, Lincs.

■ 48K Spectrum, Keyboard Interface, Interface I and two Microdrives, I/0 ports, Kempston interface, Tape controller, two recorders £300 ono. Also books and software. Write to N. Day, 3 Upper Church Street, Bath, Avon.

■ 48K Spectrum Interface 1, Microdrive, Fuller Master-Unit, joystick, Picturesque *Assembler and Monitor*. Also *The Quill, Paintbox*, Machine Code book and loads of games. £300, or will separate. Tel. (0204) 651721 and ask for Simon.

■ Swop 48K Spectrum with Kempston interface, light pen, Interface I, Microdrive, two cartridges, carrying case, for a Commodore 64, C2M tape recorder. (*Have you seen a doctor about this? Ed.*) Write to Mr R Shutts, 103 St. Lukes Road, Southend on Sea, Essex SS2 4AE.

■ Swop unused Currah MicroSpeech and Bud interstate pro for Fox programmable interface. Write to Vernon Brown, 239 Heneage Road, Grimsby, S. Humberside.

■ ZX81 with 16K Rampack. Graphics ROM fitted and some software. £45. Tel. Lowestoft 731932 and ask for R. Northwood.

■ Fuller Orator voice synthesiser and ZX Spectrum 32K Rampack. Can post. Tel. (044) 464 1787 and ask for Chris.

■ ZX Microdrive, Interface 1, joystick interface and software. Approx. £90. Tel. Kingswinford 274687 (after 5 pm) and ask for Chris.

■ Rotronics Wafadrive, as new. Swop for a light pen or sell. Write to Mr A Copley, 65 Station Road East, Ash Vale, Surrey GU12 5LT.

■ Fuller Master Unit, Speech, amplifier, loading and joystick interfaces, and eight games £35. Tel. (0564) 822528 and ask for Mr C P Ginty.

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■ Spectrum with Quickshot II joystick and £20 software inc. *Chequered Flag*. All leads, manuals etc. £130 JJ Pearson, 23 Douglas Terrace, Broughty Ferry, Dundee DD5 1JD.

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■ Microdrive, Interface 1, three cartridges, Microdrive book. Worth £120, sell for £75. Tel. (021) 554 1916 and ask for Mark Underwood.

■ Will sell three channel synthesizer and Interface 2, and Currah MicroSpeech for £60. Tel. Hove 770970 and ask for Nigel.

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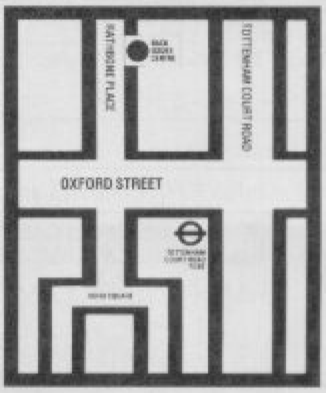
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■ Pen pal wanted who is interested in hacking and machine code. I am 16 and would like to exchange hints and tips. Write to David Leitch, 25 Main Street, Methilhill, Fife, Scotland, KY8 2DW.
■ I want a pen pal of 13 years who plays adventures. Please write to Adrian Parks, Aldeburgh House, Alexander Lane, Hutton, Brentwood, Essex.
■ I'm 18, hopeless at programming and can't find Ofnir. If you sympathise or can help, please write to Sam Hagger, 155 Great Tattenhams, Epsom Downs, Surrey KT18 5RA.
■ I am 13 years old and interested in writing programs and playing games. I would like a pen pal of 13 or over, boy or girl. Send a games list to Martin Southern, 1 Kennedy Crescent, Alverstoke, Gosport, Hampshire.
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■ Pen pal wanted to swop ideas, software, etc. Please write to Paul Butterworth, 26 Richmond Ave, Prestwich, Manchester, including games list.
■ Pen pal wanted any age or sex. I am 16 and mad on the Speccy. Write to Craig Lemon, 78 Mountbatten Road, Braintree, Essex CN7 6TP.
■ Male or female pen pals wanted. I'm 19 and my hobbies include computers, reading and writing nasty letters to Sinclair Research. Write to Alistair Davies, 43 Tan Hill Drive, Beaumont, Lancaster, LA1 2JB.
■ QL pen pal wanted any age or sex. Preferably London area. Will share ideas, information and programs. Please write to Arthur Douglas, 44 Hawkwood Crescent, London E4 7PN.
■ I am an 11 year old boy interested in computers, pets and reading. I would like to write to a boy or girl with similar interests. Please write to Chris Dawson, 80 Dalgleish Avenue, Cumnock, Ayrshire, KA18 1QY.
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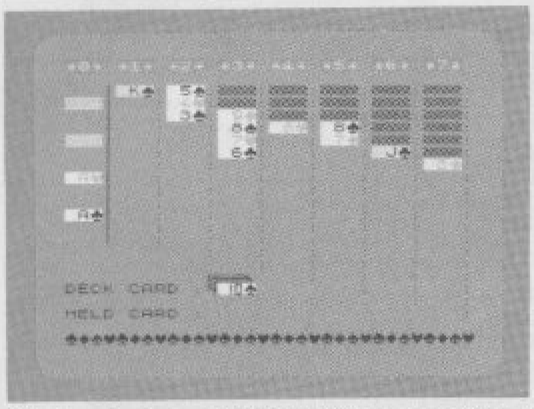
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PROGRAM POWER

Have we got a great deal for you! You can place a safe bet on* A M Grant's *version of Patience and* B Hobson's *Powerman won't be shuffling off just yet! C'mon, send your programming contributions to Gavin Monk, Program Power,* Your Spectrum *14 Rathbone Place, London W1P 1DE.

PATIENCE

BY AM GRANT



It's on the cards that this computerised version of Patience could well become a classic like the original. And there's none of this 'no one's watching if I just have a quick cheat', 'cos your Speccy's got you sussed. So get shuffling!

Playing the latest *Jet Set Willy* clone or the next *Sabre Wulf* spin-off is all very well, but there comes a time when the old grey matter needs a good stoking.

AM Grant's version of the popular card game *Patience* will probably provide just the sort of brain-teasing fuel that you're after — it even rivals some of our 100 per cent machine code games (*Well ... nearly! Ed.*).

Here at the *YS* Towerblock, we're pretty confident that you've all played *Patience* at one time or another — there are plenty of variants to choose from! This particular version, though, is the most common.

The object of the game is to turn every card face-up. The computer deals out seven columns of cards face down — the first column containing just one card, the second column two cards and so on; the top card from each column is then turned face-up. You play the game by manoeuvering the cards around on-screen so that they end up in descending order. However, you also have to make sure you place a red card on a black card and *vice versa*. For example, you can put the nine of clubs on the ten of diamonds, but the program won't allow you to put it on the ten of spades!

When you've done as much as you can with the cards you can *see*, have a look at the bottom of the screen. Yes, you've guessed — with only 28 cards on-screen, the rest of the pack can be used ... but you can only get at every third card. However, if you get stuck, don't panic — just press the 'C' key and the deck will be shuffled automatically.

There's an eighth column on-screen that's used to build up aces; obviously, once you've got an ace in the 'ace stack' you can start building the suits up, just as the other columns descend.

There are eight control keys to get to know if you're going to master this game ... so pay attention! The keys are: '5' to move the cursor left; '8' to move the cursor right; '6' to put the 'held' card or block of cards on to a column; '7' to pick up a card or block of cards from a column; '4' to pick up a card from the pack; '9' to turn over the next batch of three cards in the pack; 'C' to shuffle the pack; and lastly, 'Q' to quit the game.

All illegal moves are caught by the program, except that it does allow you to put any card in the empty columns, and not just a King. If you don't consider this to be the 'proper' way to play *Patience*, don't get angry with us ... have a little patience, and write yourself a routine to 'fix' it so that this becomes an illegal move. And then, write to *Forum* and tell us how its done!

```
 980 REM  PATIENCE
 984 DEF FN c(a$,b$)=6*(CODE b$(1)-CODE a$(1)
)+ABS (CODE b$(2)-CODE a$(2))
 990 PAPER 4: INK 0: BORDER 4
 991 BRIGHT 0: FLASH 0: OVER 0
 992 CLS
 993 PRINT AT 1,8; PAPER 3;" "; PAPER 6;"    P
ATIENCE    "; PAPER 3;" "
 994 PRINT AT 3,8; PAPER 3;" "; PAPER 6;" © A
.M.GRANT   "; PAPER 3;" "
 995 GO SUB 6000
 996 REM DISPLAY CONTROLS
 997 GO TO 2000
 998 REM GOTO RUN GAME
```

Lines 980-998 Carry out the initialisation required for the program. The function in line 984 is used to test the requested move, to see if it's valid. The routine then goes on to set the screen attributes and display the title screen.

```
 999 REM SET UP PACK
1000 FOR i=1 TO 13
1002 LET p$(i)=o$(i)+"r"
1004 LET p$(i+13)=o$(i)+"p"
1006 LET p$(i+26)=o$(i)+"o"
1008 LET p$(i+39)=o$(i)+"q"
1010 NEXT i
1014 RETURN
```

Lines 999-1014 Set up a pack of 52 different playing cards in the array, p$.

```
1046 REM PRINT A CARD
1050 LET ink=2*((c$(2)="o")+(c$(2)="q"))
1052 LET pap=7-((c$(1)="k") OR (c$(1)="1") OR
 (c$(1)="m"))
1054 PRINT AT w,z; PAPER pap; INK ink;" ";c$
1056 BEEP .05,36
1058 RETURN
```

Lines 1046-1058 Work out the INK and PAPER colours for a card and print it.

```
1098 REM INITIALISATION
1100 PRINT AT 5,8; PAPER 6; BRIGHT 1;" "; PAP
ER 4;"  SETTING UP  "; PAPER 6;" "
1101 RESTORE 1140
1102 DIM p$(52,2)
1106 FOR i=1 TO 8
1108 READ c$
1112  FOR j=0 TO 7
1114  READ byte
1116  POKE USR c$+j,byte
1118  NEXT j
1122 NEXT i
1126 LET o$="abcdefghijklm"
1130 DIM z$(22,7,2): DIM z(7,2)
1132 LET get=1500
1134 DIM a$(4): DIM l$(24,2)
1140 DATA "t",0,204,51,51,204,204,51,0
1142 DATA "r",0,28,28,127,127,107,8,62
1143 DATA "n",0,28,28,127,127,107,8,62
1144 DATA "p",0,8,28,62,127,107,8,62
1145 DATA "s",0,8,28,62,127,62,28,8
1146 DATA "o",0,8,28,62,127,62,28,8
1149 DATA "q",0,34,119,127,127,62,28,8
1150 DATA "j",0,158,146,146,146,146,146,158
1152 FOR i=1 TO 64
1154 POKE 65375+i,PEEK (15759+i)
1156 NEXT i
1159 RESTORE 1188
1161 FOR i=1 TO 4
1162 READ c$
1164 LET w=8*(CODE c$(1)-65)+15880
1166 LET z=8*(CODE c$(2)-65)+65368
1168     FOR j=0 TO 7
1170     POKE z+j,PEEK (w+j)
1172     NEXT j
1174 NEXT i
1176 RETURN
1188 DATA "AA","JK","QL","KM"
```

Lines 1098-1188 Set up the user-defined graphics and declare the arrays. Lines 1152-1188 copy characters from the ROM into the user-defined graphics area so to the UDGs contain: 'A', '1', '2', '3', '4', '5', '6', '7', '8', '9', '10', 'J', 'Q' and 'K'; note that '10' is contained in just one byte. This makes calculations and printing of the cards much easier.

```
1196 REM SET DEAL
1200 CLS : PRINT AT 17,12; FLASH 1; PAPER 6;"
DEALING"
1201 LET j=1: LET k=1
1204 FOR i=1 TO 7
1208  FOR l=k TO 7
1210  LET z$(i,l)=p$(j)
1212  LET j=j+1
1214  NEXT l
1218 LET z(i,1)=k: LET z(i,2)=k
1220 LET k=k+1
```

```
1222 NEXT i
1232 FOR i=0 TO 7
1234 PRINT  PAPER 1; INK 7;AT 1,i*4;"*";i;"*"
1236 NEXT i
1240 LET j=1: LET k='
1244 FOR i=1 TO 7
1248  FOR l=k TO 7
1250  PRINT AT i+2,4*l;"ttt:"
1252  NEXT l
1255 LET k=k+1
1256 NEXT i
1260 FOR i=1 TO 7
1261 LET w=i+2: LET z=4*i
1262 LET c$=z$(i,i): GO SUB 1050
1263 REM PRINT CARD
1264 NEXT i
1265 PRINT AT 17,0,,
1268 FOR i=3 TO 15
1269 FOR j=-4 TO 27 STEP 4
1270 PRINT AT i,7+j;":"
1272 NEXT j
1275 NEXT i
1278 LET k=2
1279 FOR i=1 TO 6
1280  FOR j=k TO 7
1281  PRINT AT i+15,4*j+3;":"
1282  NEXT j
1283 LET k=k+1: NEXT i
1284 PLOT 27,151: DRAW 0,-102
1285 LET l=1
1288 FOR i=1 TO 24
1290 LET l$(i)=p$(i+28)
1292 NEXT i
1293 PRINT £0;AT 1,0;"rspqrspqrspqrspqrspqrsp
qrspqrspq"; PAPER 6; FLASH 0;""
```

Lines 1196-1293 This rather long routine deals out the cards in the standard *Patience* format.

```
1300 REM SET FLAGS
1304 LET FL1=0: LET FL2=0
1306 LET FL3=24: LET FL4=13
1307 LET FL5=0: LET FL6=0
1308 RETURN
```

Lines 1300-1308 Set up the game flags that tell the Spectrum if you've cheated, finished, are holding a card, and so on.

```
1398 REM SHUFFLE
1400 BEEP .05,20: PRINT AT 5,0; PAPER 1; INK
7;"    PRESS ANY KEY TO SHUFFLE.   "
1401 IF INKEY$<>"" THEN  GO TO 1401
1402 IF INKEY$="" THEN  POKE 23671,255*RND: G
O TO 1402
1403 BEEP .05,36: PRINT AT 5,0,,AT 7,8; PAPER
 7;"np"; PAPER 5;" "; FLASH 0;"            "; FL
ASH 0;"  "; INK 2; PAPER 7;"oq"
1409 LET X$="          S H U F L L I N G      "
1411 FOR i=1 TO 52
1413 LET V$=X$(1 TO 1)
1414 LET X$=X$(2 TO )
1415 LET X$=X$+V$
1416 PRINT AT 7,10; PAPER 5;x$( TO 12)
1424 LET shf=1+INT (52*RND)
1426 LET t$=p$(i)
1428 LET p$(i)=p$(shf)
1430 LET p$(shf)=t$
1432 BEEP .001,(i+60)/2
1434 NEXT i
1435 PRINT AT 7,10; PAPER 6;"  SHUFFLED  "
1436 PAUSE 50
1437 BEEP .05,36
1438 BEEP .05,20
1439 PAUSE 50
1440 FOR i=1 TO 4
1442 LET a$(i)=CHR$ 143
1444 NEXT i
1448 RETURN
```

Lines 1398-1448 Shuffle the entire pack. Line 1402 increases the randomness of the shuffle by POKEing the random seed, making the 'RND' command that bit more random!

```
1498 REM GET KEY PRESS
1500 IF INKEY$<>"" THEN  GO TO 1500
1502 IF INKEY$="" THEN  GO TO 1502
1504 LET i$=INKEY$
1508 RETURN
```

Lines 1498-1508 Wait for a keypress and return with it in i$.

```
1514 REM KEY TEST
1516 IF FL4<=0 THEN  GO TO 2200
1517 REM GOTO END OF GAME
1518 GO SUB 1500: REM GET PRESS
1520 IF i$="8" THEN  GO SUB 1600: GO TO 1516
1521 REM MOVE CURSOR RIGHT
1522 IF i$="5" THEN  GO SUB 1610: GO TO 1516
1522 IF i$="5" THEN  GU SUB 1610: GO TO 1516
1523 REM MOVE CURSOR LEFT
1524 IF i$="6" THEN  GO SUB 1640: GO TO 1516
1525 REM PUT CARD DOWN ON PILE
1526 IF i$="7" THEN  GO SUB 1620: GO TO 1516
1527 REM PICK UP CARD OR PILE
1528 IF i$="9" THEN  GO SUB 1860: GO TO 1516
1529 REM NEXT BATCH OF THREE
1530 IF i$="4" THEN  GO SUB 1850: GO TO 1516
1531 REM PICK UP DECK CARD
1532 IF i$="c" OR i$="C" THEN  GO SUB 1932: G
O TO 1516
1533 REM CHEAT!
1534 IF i$="q" OR i$="Q" THEN  GO TO 1920
1535 REM QUIT GAME
1536 GO TO 1516: REM GET PRESS
```

Lines 1514-1536 Sort out which key was pressed and then send program flow to the required routine.

```
1599 REM RIGHT
1600 LET pp=pp+1
1601 POKE wp,15: LET wp=wp+4
1602 IF pp=8 THEN  LET pp=0: LET wp=22561
1605 POKE wp,143
1606 RETURN
1608 REM LEFT
1611 POKE wp,15: LET wp=wp-4
1612 LET pp=pp-1
1614 IF pp=-1 THEN  LET pp=7: LET wp=22589
1617 POKE wp,143
1618 RETURN
1620 REM PICK UP
1621 IF pp=0 THEN  RETURN
1622 IF z(pp,1)=0 OR FL1<>0 THEN  RETURN
1624 LET z=pp*4
1626 FOR w=z(pp,1) TO z(pp,2)
1628 PRINT AT w+2,z;"   :"
1629 NEXT w
1630 LET c$=z$(z(pp,1),pp)
1632 LET w=21: LET z=12
1634 GO SUB 1050: REM PRINT CARD
1636 LET wt=wp
1638 LET Fl1=pp
1639 RETURN
1640 REM PUT DOWN
1641 IF FL1=0 THEN  RETURN
1643 IF pp=0 THEN  GO SUB 1733: RETURN : REM
BUILD ON ACE PILE
1644 IF z(pp,1)=0 THEN  LET FL4=FL4+1: LET z(
pp,1)=1: GO TO 1650
1645 IF z$(z(pp,1),pp)="  " THEN  GO TO 1656
1646 LET test=FN c(c$,z$(z(pp,2),pp))
1648 IF test<>7 AND test<>9 THEN  GO SUB 1784
: RETURN : REM INVALID ENTRY,PUT CARD BACK
1650 LET nfs=z(pp,2)+1
1652 PRINT AT 21,12;"    "
1656 IF FL1=8 THEN  GO TO 1698
1658 LET z(pp,2)=nfs+z(FL1,2)-z(FL1,1)
1660 LET m=z(FL1,1)
1662 LET z=4*pp
1666 FOR i=nfs TO z(pp,2)
1668 LET z$(i,pp)=z$(m,FL1)
.670 LET c$=z$(i,pp): LET w=i+2
1672 GO SUB 1050: REM PRINT CARD
1674 LET z$(m,FL1)="  "
1676 LET m=m+1
1678 NEXT i
1682 LET z(FL1,1)=z(FL1,1)-1
1684 LET z(FL1,2)=z(FL1,1)
1686 IF z(FL1,1)=0 THEN  LET FL4=FL4-1: GO TO
 1692
1687 LET w=z(FL1,1)+2: LET z=FL1*4
1688 LET c$=z$(z(FL1,1),FL1)
1690 GO SUB 1050: REM PRINT CARD
1692 LET FL1=0
1694 RETURN
1698 LET z(pp,2)=nfs
1699 LET z$(nfs,pp)=c$
1700 LET w=nfs+2: LET z=4*pp
1702 GO SUB 1050: REM PRINT CARD
1704 PRINT AT 19,12;"    "
1706 LET FL3=FL3-1: GO SUB 1880
1707 IF FL3=0 THEN  PRINT AT 19,15;"         ":
 LET FL4=FL4-10: GO TO 1724
1709 IF l>FL3 THEN  LET l=FL3: GO TO 1720
1712 FOR i=1 TO FL3
1714 LET l$(i)=l$(i+1)
1716 NEXT i
1720 LET w=19: LET z=12
1722 LET c$=l$(1)
1723 GO SUB 1050: REM PRINT CARD
1724 LET FL1=0
1726 RETURN
```

Lines 1599-1726 Contain the cursor control routines. Lines 1600-1606 move the cursor right, and lines 1611-1618 move the cursor left. Lines 1620-1639 allow you to pick up a card. Lines 1640-1726 allow you to place a card; this routine also checks to

see if the card has been placed in a valid position — if it hasn't, it's returned to its original position on-screen.

```
1730 REM ACE BUILD
1733 IF FL1=8 THEN  GO TO 1736
1734 IF z(FL1,1)<>z(FL1,2) THEN  GO SUB 1784:
 RETURN : REM INVALID ENTRY,PUT BACK CARD
1736 LET suit=CODE c$(2)-157
1738 IF CODE a$(suit)<>CODE c$(1)-1 THEN  GO
SUB 1784: RETURN : REM INVALID ENTRY,PUT BACK
 CARD
1742 LET a$(suit)=c$(1)
1744 LET z=0: LET w=3*suit+1
1746 PRINT AT 21,12;"   "
1748 GO SUB 1050: REM PRINT CARD
1750 IF FL1=8 THEN  GO TO 1776
1752 LET z$(z(FL1,1),FL1)="  "
1754 LET z(FL1,1)=z(FL1,1)-1
1756 LET z(FL1,2)=z(FL1,1)
1758 IF z(FL1,1)=0 THEN  LET FL4=FL4-1: GO TO
 1770
1760 LET c$=z$(z(FL1,1),FL1)
1762 LET w=z(FL1,1)+2
1764 LET z=FL1*4
1766 GO SUB 1050: REM PRINT CARD
1770 LET FL1=0: RETURN
1776 GO SUB 1704: RETURN
```

Lines 1730-1776 Put the card held on its ace stack, after checking that the move is legal. If it's invalid, the card is returned to its original position.

```
1780 REM PUT BACK
1784 PRINT AT 21,12;"     "
1785 IF FL1=8 THEN  GO TO 1800
1786 POKE wp,15
1787 LET wp=wt
1788 LET pp=FL1
1789 POKE wp,143
1791 LET z=4*pp
1792 FOR i=z(pp,1) TO z(pp,2)
1793 LET w=i+2
1794 LET c$=z$(i,pp)
1795 GO SUB 1050: REM PRINT CARD
1796 NEXT i
1798 LET FL1=0: RETURN
1800 LET w=19: LET z=12
1802 LET FL1=0
1803 GO SUB 1050: REM PRINT CARD
1804 RETURN
```

Lines 1780-1804 An invalid move causes this routine to be called, returning the card to its original position.

```
1850 IF FL1<>0 OR FL3=0 THEN  RETURN : REM AL
READY HOLDING A CARD
1852 LET FL1=8: LET c$=l$(l)
1854 LET w=21: LET z=12
1855 PRINT AT 19,12;"    "
1856 GO SUB 1050: RETURN
1857 REM PICK UP & DISPLAY CARD
1858:
1859 REM NEXT 3 BATCH
1860 IF FL3=0 OR FL1<>0 THEN  RETURN : REM CA
N'T TURN OVER BATCH
1861 IF l=FL3 THEN  LET l=0
1862 LET l=l+3
1863 PRINT AT 21,12;"    "
1864 GO SUB 1880
1866 LET w=19: LET z=12
1867 IF l>FL3 THEN  LET l=FL3
1869 LET w=19: LET z=12
1870 LET c$=l$(l)
1873 GO SUB 1050: RETURN
1874 REM TURN OVER BATCH & PRINT           NEW
TOP CARD ON DECK
1880 IF FL3=2 AND FL5=0 THEN  GO SUB 1890: RE
TURN
1882 IF FL3=1 AND FL6=0 THEN  GO SUB 1893
1884 RETURN
```

Lines 1850-1884 Pick up the top card from the deck and display it as the 'held' card. Note that you can't see any of the cards below it until you've decided where you want to put it.

```
1890 OVER 1: PLOT 91,20: DRAW -1,0: DRAW 0,8:
 DRAW 24,0: DRAW 0,-1: OVER 0
1891 LET FL5=1: RETURN
1893 OVER 1: PLOT 93,18: DRAW -1,0: DRAW 0,8:
 DRAW 24,0: DRAW 0,-1: OVER 0
1894 LET FL6=1: RETURN
```

Lines 1890-1894 Remove the 'under cards' of the deck, once a card has been selected ... just like a real deck of cards!

```
1898 REM TURN OVER
1900 LET c$=z$(fl1,z(fl1)-1)
1902 LET w=z(fl1)+2
1904 LET z=fl1*4
1906 GO SUB 1050: REM PRINT CARD
1907 BEEP .05,20
1908 RETURN
```

Lines 1898-1908 Turn over the next batch of three cards.

```
1918 REM QUIT
1920 BORDER 2
1921 GO SUB 4000: REM LOSE
1922 PRINT AT 17,0,,,,,,,,,,
1923 PRINT AT 19,0; PAPER 6;"     How about an
other game ?    "
1924 GO SUB 1500: REM GET PRESS
1925 CLS
1926 IF i$="y" OR i$="Y" THEN  GO TO 2001: RE
M PLAY NEW GAME
1927 STOP
```

Lines 1918-1927 Quit the current game and ask if you'd like to play another.

```
1930 REM CHEAT SUBROUTINE
1932 IF FL1<>0 THEN  BEEP .05,20: RETURN
1936 PRINT AT 19,12;"   "
1940 LET FL2=FL2+1
1942 FOR i=1 TO FL3
1944 LET t$=l$(i)
1946 LET shf=1+INT (FL3*RND)
1948 LET l$(i)=l$(shf)
1950 LET l$(shf)=t$
1952 NEXT i
1954 GO SUB 1860: REM NEXT BATCH
1956 BEEP .05,20: RETURN
```

Lines 1930- 1956 This routine allows you to cheat and shuffle the cards you've got left in the pack. This means you often find that mischevious card that never seems to come up!

```
2000 GO SUB 1100: GO SUB 1000
2001 REM INITIALISE: SET UP PACK
2002 GO SUB 1400: REM SHUFFLE
2004 GO SUB 1300: GO SUB 1200
2005 REM SET FLAGS: DEAL CARDS
2006 LET wp=22577: LET pp=4
2007 POKE wp,143
2010 PRINT AT 19,0;"DECK CARD : "; PAPER 7;"t
tt"
2011 PLOT 94,16: DRAW 0,8: DRAW 24,0: PLOT 94
,18: DRAW -2,0: DRAW 0,8: DRAW 24,0: DRAW 0,-
2: PLOT 92,20: DRAW -2,0: DRAW 0,8: DRAW 24,0
: DRAW 0,-2
2012 FOR i=4 TO 13 STEP 3
2014 PRINT AT i,0; INK 2; PAPER 7;"ttt"
2016 NEXT i
2018 PRINT AT 21,0;"HELD CARD :"
2020 BEEP .1,36: BEEP .1,20
2022 GO TO 1516: REM GET PRESS
```

Lines 2000-2022 Call all the subroutines required to play the game. Lines 2010-2018 draw the deck and ace stacks.

```
2100 REM FINISH ROUTINE
2200 PRINT AT 17,0,,,,,,,,,,
2207 PAPER 2: INK 7
2208 PRINT AT 1,0;"rspqrspqrspqrspqrspqrspqrs
pqrspq"; PAPER 6; FLASH 0;""
2212 PRINT AT 17,0; BRIGHT 1; PAPER 4; INK 0;
"  WELL DONE  YOU HAVE FINISHED  "
2214 PAPER 4: INK 0
2216 GO SUB 3000
2218 IF FL2=0 THEN  GO TO 2221
2219 PRINT AT 18,0; PAPER 5;"    but you did "
; BRIGHT 1;" CHEAT "; BRIGHT 0;" "; PAPER 7;
INK 2;FL2; FLASH 0; PAPER 5; INK 0;" time";
2220 IF FL2>1 THEN  PRINT  PAPER 5;"s";
2221 PRINT  PAPER 5;TAB 32: GO TO 1923
```

Lines 2100-2221 This is the 'end of game' routine, announcing to all and sundry whether you have won or not, and how often you cheated!

```
2999 REM WIN
3001 RESTORE 3100
3003 FOR i=1 TO 18
3005 READ l,p
3007 BEEP l/5,p-24: BEEP l,p
3009 NEXT i
3011 RETURN
3100 DATA .2,22,.1,22,.25,27,.25,27,.25,29,.2
5,29,.4,34,.1,31,.2,27,.1,27,.2,31,.1,27,.2,2
4,.3,32,.1,32,.2,29,.1,26,.4,27
```

Lines 2999-3100 Play the tune that accompanies a winning game.

```
3997:
3998:
3999 REM LOSE
4001 RESTORE 4100
```


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PROGRAM POWER

```
4002 FOR i=1 TO 9
4004 READ l,p
4006 BEEP 1/15,p-24: BEEP 1/3,P
4008 NEXT i
4010 FOR i=1 TO 7
4011 BRIGHT 1
4012 LET k=z(i,1)-1
4014 FOR j=1 TO k
4016 LET c$=z$(j,i)
4018 LET w=j+2
4020 LET z=4*i
4021 GO SUB 1050
4022 NEXT j
4023 NEXT i
4028 BRIGHT 0: OVER 0
4030 BORDER 4
4032 RETURN
4100 DATA .4,27,.4,26,.4,27,.4,26,.35,27,.45,
22,.35,25,.3,23,.6,20
```

Lines 3999-4100 Play the tune that accompanies a losing game. This routine also upturns all the undisplayed cards in the deck.

```
5000 SAVE "patience" LINE 1
5005 VERIFY "patience"
```

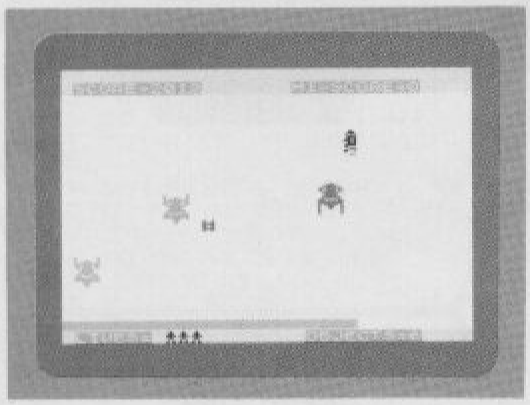
Lines 5000-5005 Comprise the 'SAVE' routine. This can be easily modified to work with Microdrives, using 'SAVE *"m";1;"patience"' and so on.

```
6000 PRINT AT 9,8; BRIGHT 1; PAPER 6; INK 5;"
"; PAPER 1;" CONTROL KEYS "; PAPER 6;" ": PR
INT
6001 PAPER 5
6002 PRINT " 5 LEFT","8 RIGHT";TAB 32
6005 PRINT " 6 PUT DOWN","7 PICK UP";TAB 32
6010 PRINT " 4 PICK UP FROM DECK";TAB 32
6015 PRINT " 9 NEXT BATCH OF THREE";TAB 32
6018 PAPER 4
6020 RETURN
```

Lines 6000-6020 Print up the details of the control keys needed to play the game.

POWER MAN

By B Hobson



Jetman's back and once again he's matched against the might of the machine code moon monsters. There are 5 levels till you gain an extra life, so there's plenty of opportunity to practise your arcade skills.

Just when you thought that *Jetman* had been pensioned off, he prepares to make a comeback. Yes, the star of screen and monitor, *Jetman* has returned from the comfort of his South Coast geriatric home, forsaking all thoughts of a weekly pension, to grace your Spectrums once more.

His current exploits involve him in collecting objects such as spanners, shovels and clamps, no doubt with the intention of making an extra bob or two as a moonlighting motor mechanic. (*These are hard times — Ed.*) That or his bath chair is due for a service.

Unfortunately, *Jetman*'s twilight years are not destined to be totally trouble free. The terrible lunar monsters are out to thwart him (OK, this isn't the Worthing you know and love, but we never promised realism).

You control *Jetman* with the following keys: A — up, Z — down, M — right, N — left. If you let our old chum touch one of the lunar monsters, you'll lose a life and you only have three at the start. However, if you manage to reach level 5, you'll not only gain an extra life but you'll deserve a golden handshake. At *YS* we can only make it as far as level 3 before *Jetman* gives up the ghost.

So, reach for the Grecian 2000 and don't take an age typing in the program. There's life in the old man yet!

```
5 CLEAR 45055
10 LET hs=0
15 PRINT FLASH 1;AT 5,10;"PLEASE WAIT"
20 BRIGHT 0: INVERSE 0: OVER 0: FLASH 0
30 GO SUB 8000
35 GO SUB 8500
38 GO SUB 9000
40 PAPER 7: INK 1: BORDER 1: CLS
```

Lines 5-40 The opening lines lower Ramtop to prepare for the machine code which will print and animate the lunar monsters. Then print the 'Please Wait' message and call up the 3 subroutines which set up the machine code, graphics and instructions.

```
45 REM SET VARIABLES
50 LET s=2
60 LET sc=0: LET ob=0: LET li=4
70 LET le=1
```

Lines 45-70 Set up the initial variables; sc-score, le-level, ob-objects and li-lives. If you find the game a touch too tricky, you can always give yourself more lives.

```
200 REM PRINT SCREEN
202 GO SUB 5000
205 FOR f=0 TO 63: PRINT PAPER 6;" ";: NEXT
f
206 FOR f=0 TO 31: PRINT PAPER 6;AT 21,f;"
";: NEXT f
207 PRINT PAPER 2; INK 7;AT 1,1;"SCORE=";sc
;AT 1,18;"HI-SCORE=";hs
210 PRINT PAPER 2; INK 7;AT 21,19;"OBJECTS=
";ob
220 PRINT PAPER 2; INK 7;AT 21,1;"LIVES= "
240 PRINT PAPER 6;AT 21,7;" ";
250 FOR n=1 TO li-1
260 PRINT PAPER 6; INK 0;"t";
270 NEXT n
280 FOR f=0 TO 255
290 PLOT f,9: DRAW INK 3;0,5: NEXT f
300 LET x=17: LET y=15
310 FOR f=10 TO 50 STEP 5
320 PRINT FLASH 1;AT 10,12;"LEVEL ";le
330 BEEP .08,f: BEEP .05,f
340 NEXT f
350 PRINT AT 10,12;"            "
400 GO SUB 4500
```

Lines 200-400 Print the first screen. Lines 280-290 print the time bar at the bottom of the screen.

```
412 REM MAIN GAME
415 FOR t=255 TO 0 STEP -1
420 PLOT t,9: DRAW INK 7;0,5
425 LET p=32766
430 GO SUB 3000
435 IF i=183 THEN GO SUB 3070
440 IF i=187 THEN GO SUB 3160
445 LET p=65022
450 GO SUB 3000
455 IF i=190 THEN GO SUB 3130
460 LET p=65276
465 GO SUB 3000
470 IF i=189 THEN GO SUB 3100
475 GO SUB 3030
480 RANDOMIZE USR 45056
485 IF ATTR (x,y+1)<>56 OR ATTR (x+1,y+1)<>5
6 THEN GO SUB 7000
487 IF ATTR (xx,yy)>57 THEN BEEP .05,1: BEE
P .009,4: GO SUB 4500
488 IF ATTR (xx,yy)<57 THEN GO SUB 4000
490 NEXT t
500 GO TO 7000
```

Lines 412-500 The main game routine in which the time bar is reduced (line 420), the keyboard scan subroutine is called (line 430), the keyboard scan subroutine is called (line 430) and other subroutines are called to make the movements, etc.

```
3000 REM MOVEMENT ROUTINES
3005 LET i=IN p
3010 IF i>191 THEN LET i=i-64
3020 RETURN
3030 PRINT INK 0;AT x,y;" m ";AT x+1,y;" n "
;AT x-1,y;"   ";AT x+2,y;"   "
3060 RETURN
3070 IF y<1 THEN RETURN
3080 LET y=y-1
3090 RETURN
3100 IF x>16 THEN RETURN
3110 LET x=x+1
3120 RETURN
3130 IF x<4 THEN RETURN
3140 LET x=x-1
3150 RETURN
3160 IF y>28 THEN RETURN
3170 LET y=y+1
```

```
3180 RETURN
```

Lines 3000-3180 This subroutine scans the keyboard and then updates Jetman's position.

```
4000 REM  PICK UP OBJECT
4003 RANDOMIZE
4005 BEEP .05,1: BEEP .09,4
4010 LET sc=sc+50+INT (0+RND*25)
4015 LET ob=ob+1
4020 PRINT  PAPER 2; INK 7;AT 1,7;sc;AT 21,27
;ob
4025 IF ob=10 THEN  GO TO 6500
4030 GO SUB 4500
4040 RETURN
```

Lines 4000-4040 This routine picks up an object and then increases your score. It also checks to see if you've completed your task.

```
4500 REM PRINT OBJECT ON SCREEN
4505 RANDOMIZE
4510 LET xx=4+INT (RND*13)
4515 LET yy=2+INT (RND*26)
4520 BEEP .009,5
4525 RANDOMIZE
4530 LET a$=CHR$ (158+INT (RND*5))
4540 PRINT  INK 1;AT xx,yy;a$
4560 RETURN
```

Lines 4500-4560 Positions the objects to be collected at random on the screen.

```
5000 REM  POKE MACHINE CODE
5001 REM        VARIABLES
5005 CLS : LET b=50000
5007 RANDOMIZE
5010 FOR f=1 TO s
5020 POKE b,INT (RND*29+1)
5030 POKE b+1,INT (RND*13+4)
5040 POKE b+2,INT (RND*3-1)
5050 POKE b+3,INT (RND*3-1)
5060 IF NOT PEEK (b+2) AND NOT PEEK (b+3) THE
N GO TO 5040
5070 POKE b+4,INT (RND*3+2)+128*(RND>.5)
5080 POKE b+5,255
5090 LET b=b+5
5100 NEXT f
5110 RETURN
```

Lines 5000-5110 Sets up 'variables' for the machine code which controls the moon monsters.

```
6000 REM  END OF GAME
6010 BORDER 1: PAPER 1: INK 7: CLS
6020 PRINT  PAPER 6; INK 0;AT 1,10;" J E T M
A N "
6030 PRINT '';TAB 10;"HI-SCORE ";hs
6040 PRINT '';TAB 6;"You Reached Level ";le
6050 PRINT '';TAB 6;"You Scored ";sc
6060 IF sc>hs THEN  PRINT '';TAB 11;"Well don
e"'';TAB 3;"You beat the highest score"
6070 PRINT £1;TAB 5; PAPER 6; INK 0;" ANY KEY
 TO PLAY AGAIN "
6080 IF sc>hs THEN  LET hs=sc
6090 PAUSE 0
6100 GO TO 40
```

Lines 6000-6100 This routine prints up the score at the end of each game, so you know how well you fared.

```
6500 REM   NEW LEVEL
6505 FOR t=0 TO 50: NEXT t
6510 LET s=s+1: LET ob=0: LET le=le+1
6515 IF le=5 THEN  LET li=li+1
6520 LET sc=sc+1000: PRINT  PAPER 2; INK 7;AT
 1,7;sc
6550 GO TO 200
```

Lines 6500-6550 OK, so you've made it to a new level — this subroutine prepares for the next one.

```
7000 REM  LOOSE A LIFE
7002 FOR t=0 TO 50: NEXT t
7005 FOR f=50 TO 0 STEP -5
7010 BEEP .05,f
7020 BORDER INT (RND*6)
7030 NEXT f
7040 LET li=li-1
7067 IF li=0 THEN  GO TO 6000
7068 BORDER 1
```

```
7070 GO TO 200
```

Lines 7000-7070 If you've been bumped off by a moon monster, this routine takes away a life and checks to see if you've run out.

```
8000 REM  MACHINE CODE
8005 LET s=0
8010 FOR n=45056 TO 45056+178
8020 READ a: POKE n,a: LET s=s+a
8030 NEXT n
8040 IF s<>20957 THEN  BEEP 1,4: PRINT AT 10,
1;"ERROR IN DATA FROM LINE 8030": STOP
8050 RETURN
8060 DATA 221,33,80,195,221,126,0,254,255,40,
34,95,221,86,1,6,3,62,22,215,122,215,123,215,
62,32,215,62,32,215
8070 DATA 20,16,240,221,35,221,35,221,35,221,
35,221,35,24,215,221,33,80,195,221,126,0,254,
255,200,221,134,2,254,255,40,4,254,31,32,8,22
1
8080 DATA 126,2,237,68,221,119,2,221,126,1,25
4,2,40,4,254,17,32,8,221,126,3,237,68,221,119
,3,221,126,0,221,134,2,221,119,0,221,126,1,22
1
8090 DATA 134,3,221,119,1,14,144,221,203,4,12
6,40,10,221,203,4,190,62,6,129,79,24,4,221,20
3,4,254,221,126
8100 DATA 4,203,191,198,56,50,143,92,221,86,1
,6,3,62,22,215,122,215,221,126,0,215,121,215,
12,121,215
8110 DATA 12,20,16,238,221,35,221,35,221,35,2
21,35,221,35,195,49,176
```

Lines 8000-8110 This is the machine code data.

```
8500 REM   GRAPHICS
8505 LET s=0
8510 FOR n=USR "a" TO USR "t"+7
8520 READ a: POKE n,a: LET s=s+a
8530 NEXT n
8540 IF s<>17869 THEN  BEEP 1,4: PRINT AT 10,
1;"ERROR IN DATA FROM LINE 8560": STOP
8550 RETURN
8560 DATA 0,0,3,15,63,231,231,63
8570 DATA 0,0,192,240,252,231,231,252
8580 DATA 15,15,63,55,240,255,255,207
8590 DATA 240,240,252,236,15,255,255,243
8600 DATA 195,195,193,192,192,192,0,0
8610 DATA 195,195,131,3,3,3,0,0
8620 DATA 192,192,195,207,255,231,231,63
8630 DATA 3,3,195,243,255,231,231,252
8640 DATA 15,15,63,55,240,255,255,207
8650 DATA 240,240,252,236,15,255,255,243
8660 DATA 3,3,1,0,0,0,0,0
8670 DATA 192,192,128,0,0,0,0,0
8680 DATA 28,62,69,61,23,123,251,27
8690 DATA 63,127,96,15,96,229,0,10
8700 DATA 36,60,24,24,24,24,60,36
8710 DATA 124,16,16,16,16,124,124,56
8720 DATA 28,48,112,216,140,134,3,1
8730 DATA 66,66,231,255,231,231,255,231
8740 DATA 28,8,60,36,32,32,36,60
8750 DATA 24,24,60,90,24,36,36,102
```

Lines 8500-8750 These set up the User Defined Graphics which are littered throughout the program. As a guide, to get into graphcs mode press Caps Shift/9 and then the required character. It will then appear as a graphic. Give it a go — you could end up with a mutant Jetman.

```
9000 REM  INSTRUCTIONS
9010 BORDER 1: PAPER 1: INK 7: CLS
9020 PRINT  PAPER 6; INK 0;AT 1,10;" J E T M
A N "
9025 PRINT '';TAB 7;"Written by B.HOBSON"
9030 PRINT '';"Can you help JETMAN to avoid t
hemoon monsters and collect up theobjects whi
ch appear at random."
9040 PRINT '';"You  must  collect  TEN  object
sto reach the next level."
9050 PRINT '';"The moon  monsters however, wil
ldo there  best to  stop  you, asthey  increa
se  by  ONE on  eachlevel."
9060 PRINT '';"You  have  FOUR lives  plus  ON
Eextra  life  if you  reach levelFIVE."
9070 PRINT £1;TAB 5; PAPER 6; INK 0;" ANY KEY
 TO CONTINUE "
9080 PAUSE 0
9085 CLS
```

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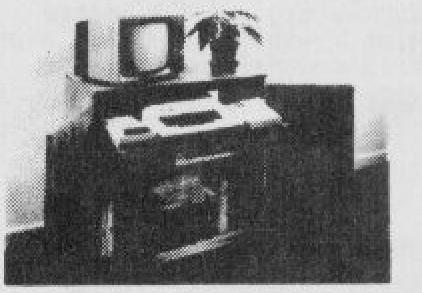
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```
9090 PRINT  PAPER 6; INK 0;AT 1,10;" J E T M
A N "
9100 PRINT '';TAB 12; PAPER 2; INK 7;" OBJECT
S "
9105 PRINT ';TAB 9;"50 to 75 POINTS"
9110 PRINT ';TAB 11;"o = Spanner";'';TAB 11;"
p = Shovel";'';TAB 11;"q = Pick";'';TAB 11;"r
 = Oxygen";'';TAB 11;"s = Clamp"
9120 PRINT £1;TAB 5; PAPER 6; INK 0;" ANY KEY
 TO CONTINUE "
9130 PAUSE 0
9140 CLS
9150 PRINT ''; PAPER 6; INK 0;AT 1,10;" J E T
 M A N "
9160 PRINT  ;TAB 9; PAPER 2; INK 7;" KEY  CO
NTROLS "
9170 PRINT '';TAB 12;"A:=UP";'';TAB 12;"Z:=DO
WN";'';TAB 12;"N:=LEFT";'';TAB 12;"M:=RIGHT"
9180 PRINT ';TAB 3;"You may also use two keys
";';TAB 2;"together to move diagonally"
9190 PRINT £1;TAB 7; PAPER 6; INK 0;" ANY KEY
 TO START "
9200 PAUSE 0
9210 CLS
9220 RETURN
```

Lines 9000-9220 This subroutine prints up the two screens of instructions.

Troubleshootin' Pete says: This is a rather nice bit of programming but some extra speed could be injected by making some changes to lines 3070-3180. These lines each run through checks to see if Jetman is about to fall off the edge of the screen. But you can avoid all those sub-routines by checking and updating in one line. See what you think of the following:

```
LET x=x+(INKEY$="Z" AND x<17)>—(INKEY$="A" AND x>4)
LET y=y+(INKEY$="M" AND y<29)>—(INKEY$="N" AND y>0)
```

Pretty neat, eh, even if I say so myself *(No one else will! — Ed.)*. These lines check which keys you're pressing and find out whether you're going off the screen edge into oblivion. They alse save a lot of time which is crucial for fast arcade games in Basic.

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CIRCE

Publisher, journalist and author of over 50 computing books,* Tim Hartnell *reckons he owes it all to* Uncle Clive. Sue Denham *finds out why ...



TONY SLEEP

"Read All About It!"

"I guess it all started soon after I came to London from Australia back in 1979. You could 'feel' that computers were going to be the 'next big thing', but there was no way I could afford a second-hand Commodore PET for £400! But then, in 1980, Sinclair Research launched the ZX80 for £110 and it all became possible."

Five years on, Tim Hartnell now runs the publishing company, Interface Publications, and has written over 50 titles for many micros, including six or seven for the Spectrum. But his main claim to fame must be the uniting of Sinclair users under the banner of the ZX80/ZX81 Users' Club, complete with its own computing magazine, *Interface.* It was the first magazine solely dedicated to the home computer user.

"I think it's funny to look back on those days — I remember writing in *Interface* that there was no point in giving users more than 1K as no-one needed that much memory! It was all so expensive then anyway. Sinclair Research was charging £16 for a gadget to hold the RAM packs and £12 for each 'K!"

"The Users' Club was first advertised in a three-line entry in the back of *PCW* — and I remember thinking it might take a few months to take off and not to be too disappointed. That's how little I knew! Within six weeks, the club had over 3,000 members!

"For the first few months, I did a small newsletter and approached a publisher with a view to bringing out a 'proper' magazine. But they turned out to be a bunch of crooks who just wanted to bleed the membership dry, so I ended up doing the whole thing myself.

"The whole operation was run from my home — wherever you looked there was a mess of typesetting and computer printout! It became so difficult to run that in the end I went ex-directory and used a mailing address. Anonymity is a wonderful thing at times!"

Of course, being a computing personality does have its advantages. "I remember being one of the first people to get a look at the ZX81 and Spectrum. When I got my hands on the Spectrum, there were only three in existence outside Sinclair Research and two had already broken. During the time I had it, I was half-way through a program and I'd lost the power pack — I ended up wiring up to the power pack from an Acorn Atom. Of course, as soon as the smoke started appearing I unplugged it all ... but it still worked!

What do you reckon to Sinclair Research's approach to its products? "Well, if I was to tell you that way back in 1980, I was asked to check out the machine that was to become the ZX81 and I had a few problems with the 16K memory add-on, I doubt you'd be surprised. But, at the time, I was a bit upset to find I'd lost all my programming in what was probably the world's first ever recorded 'white-out' ... to the point that I phoned up Altwasser (the main designer of the ZX81 and Spectrum) and told him. He said, "I think you're asking too much of it, Tim.", so nothing was ever done and for a year, users had to put up with losing their programs. Of course, the boffins up at Sinclair Research had the device bolted down on the bench and operated with an industrial power supply — in other words, it wasn't designed for human beings!"

"I suppose I know why people like me go along with the situation, though. I enjoy being part of the whole Sinclair 'discovery process' ... I think Sinclair users just want to help the company get it right. But it's a fast-moving industry and these things should be put to rights nowadays before the product comes out. But, in its defence, it's also a young industry ... and, although we're talking about the ZX80 and ZX81 as if they're part of ancient history, in real terms it was only a couple of pairs of sneakers ago!"

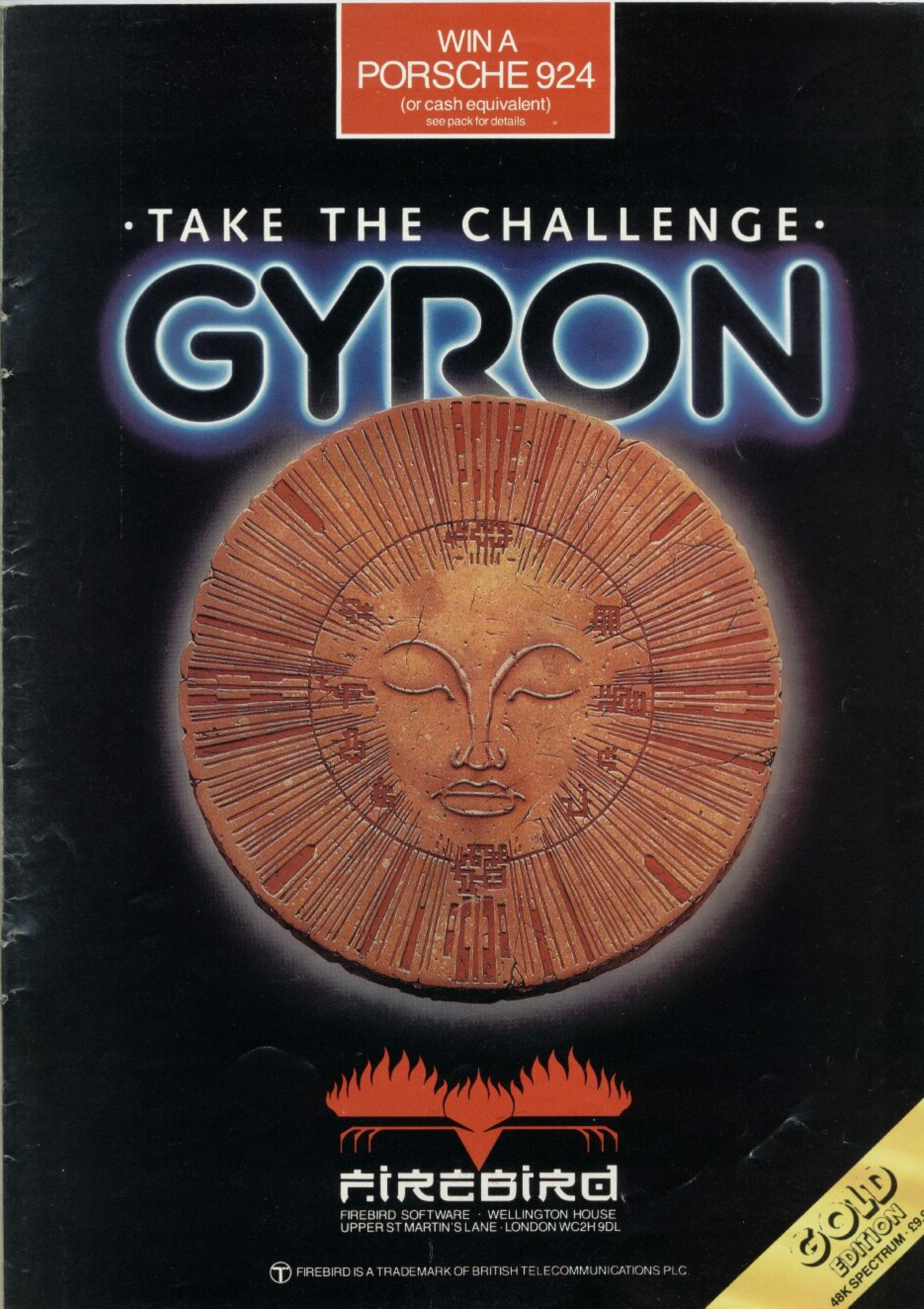
How about all the books you've written? "Well, I guess that my success as a publisher and author is all down to Uncle Clive's ZX80. Once I'd written *Making The Most Of Your ZX80,* I never looked back. I haven't had a really good review of one of my books in the UK for years ... and it does hurt me. On the other hand, it's pleasing to know that I've encouraged a lot of programmers."

And what of the future? "Well, the Spectrum will be with us for many a year ... in whatever form! But I'm not sure programming will ever be like the 'old days'. It may sound silly, but I used to enjoy finding out all about the ZX80 while I balanced a frozen milk carton precariously on top to cool it down!"

BREAK IN THE CIRCE

YS is taking a break from cornering computer celebreties, but we'll be back with a vengeance, with *your very own questions!* Let us know *who* you want us to ambush, and suggest the *five* big questions you'd like us to fire away! People and Questions on a postcard please to: *P's & Q's, Your Spectrum, 14 Rathbone Place, London W1P 1DE.*

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